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Four master teachers who fostered American turn-of-the-(20TH)-century mycology and plant pathology

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Abstract—The Morrill Act of 1862 afforded the US states the opportunity to found state colleges with agriculture as part of their mission—the so-called "land-grant colleges." The Hatch Act of 1887 gave the same opportunity for agricultural experiment stations as functions of the land-grant colleges, and the "third Morrill Act" (the Smith-Lever Act) of 1914 added an extension dimension to the experiment stations. Overall, the end of the 19th century and the first quarter of the 20th was a time for growing appreciation for, and growth of institutional education in the natural sciences, especially botany and its specialties, mycology, and phytopathology. This paper outlines a particular genealogy of mycologists and plant pathologists representative of this era. Professor Albert Nelson Prentiss, first of Michigan State then of Cornell, Professor William Russel Dudley of Cornell and Stanford, Professor Mason Blanchard Thomas of Wabash College, and Professor Herbert Hice Whetzel of Cornell Plant Pathology were major players in the scenario. The supporting cast, the students selected, trained, and guided by these men, was legion, a few of whom are briefly traced here.

Key words—"New Botany," European influence, agrarian roots

Chapter 1. Introduction

When Dr. Lexemual R. Hesler died in 1979, he left a manuscript entitled "Biographical sketches of deceased North American mycologists, including a few European mycologists" (Hesler 1975). These 147 "thumb-nail" biographies, ranging from a half-page to five pages, included almost no plant pathologists, even though Hesler was one for the first half of his career. Moreover, Hesler was

a proud product of Wabash College (class of 1911) and extolled the role of Prof. Mason Thomas in his life. Second, I spent a single pivotal semester (Fall 1956) in the Cornell Plant Pathology Department and retained some appreciation of scientists associated with that department. Third, Hesler had alluded to intradepartmental strife at Cornell which led to his migration to the University of Tennessee. Later, I came upon the paper by G.C. Kent (1979), long-time head of the Cornell Plant Pathology Department, who summarized Prof. Thomas's role in guiding selected Wabash students into graduate education leading to successful careers. Finally, the paper by R.P. Korf (1991), a Cornellian as undergraduate, Ph.D. student, and career faculty member, referred both to Prof. Thomas and to the Cornell disturbance. As added background, the influence of post-Civil War but pre-World War I events on the maturation of mycology in North America has already been published (Petersen 2019).

In addition to the Hesler heritage, some historical topics should be considered. First, the summer of 1862 was a season of government turmoil. As the Civil War spread and raged, the congressmen representing the States of the Confederacy walked out of the federal congress, ceding control to the Union states. In the midst of a war, the federal government was not only short on cash, but through expansion and the Louisiana Purchase, found itself owner of almost limitless land west of the Mississippi River. Respectful of its critical role in the War effort, the government was moved to expand its role in agriculture. It was also calculated that if land grant legislation were passed, perhaps some hearts in the south would be persuaded that rebellion was too costly. Two bills were put forward in 1862 to respond to these schemes as well as to some popular agitation that had been simmering for years.

There was already a history of bounty-land warrants, especially to recognize veterans of military service from the American Revolution forward. But in a few days during the War Between the States, new laws were enacted. On 15 May 1862, Congress established the Department of Agriculture and five days later, on 20 May, the Homestead Act was signed into law. It guaranteed 126 acres of federal land to any person willing to settle on and cultivate it. The law answered a movement for free ownership of otherwise unsettled land. In brief, this was the first "land-grant" act of the age. Within days (July 2) the Morrill Act was signed, gifting, upon application, each state a grant of federally owned land upon which to found a college at which agriculture was a significant part of the educational program.

Second, by the decade (the 1880s) in which most students covered in this narrative were born, relations were strained between the Euro-American

settlers—in their incessant western movement—and the Amerindians, whose land, hunting territory, and economic bases were being usurped. The military confrontations had largely subsided, but establishment of reservations and relegation of Amerindians to new lands (and therefore modes of survival) were well underway. Much of this escaped the headlines "back east," but west of the Mississippi River these interethnic adjustments were big news. As the issues extended into the early and middle 20th century, "western territories" applied for statehood, the Morrill Act was ratified, states filed applications, land grants were assigned, land-grant colleges were established, and agriculture expanded as both academic discipline and lifestyle. The Hatch Act of 1887 repeated the process, this time mandating that agricultural experiment stations be associated with the land-grant institutions. Concurrently, plant pathology was increasingly recognized as a positive adjunct to the farmer. After all, at the turn of the 20th century, 50% of all Americans made their living by farming. Finally in 1914 just prior to World War I, the "third Morrill Act" (the Smith-Lever Act) brought laboratory research into the hands of the farmers themselves.

Science itself was evolving during this period, and the general focus on agriculture and the land grant movement spawned the development of laboratory and experimental approaches in both research and teaching. Although this narrative is directed at a particular network of teachers, their students and the growth of mycology and plant pathology in the United States, this tableau paralleled changes in natural science pedagogy, especially because some of the teacher-innovators were also actors in the main plot. Several individuals presented here studied in Europe with scientific innovators. They brought back to the US not only techniques but also a keen ambition to place botany and its sub-sciences at the forefront of academic studies. Central to the education of several scientists was the "New Botany" as espoused by Charles E. Bessey, early educator in botanical sciences, and several other professors. This pedagogical progress has been summarized by Sundberg (2011, 2012, 2014).

The starring players in the current report are four in number: Prof. Albert Nelson Prentiss, on faculty at the precursor of Michigan State University, who moved to the fledgling Cornell University upon its opening in 1868; Prof. William Russel Dudley, student at Cornell during the Prentiss years and thereafter a faculty member with Prentiss; Prof. Mason Blanchard Thomas, a fellow student with Dudley, but who moved to Wabash College; and Prof. Herbert Hice Whetzel, student at Wabash and Cornell, later Head of the Cornell Plant Pathology Department. The supporting cast, the students of these professors, was legion, of which some have been selected here for lesser roles.

Chapter 2. Albert Nelson Prentiss (22 May 1836–14 August 1896)

In 1835, upstate New York was decidedly rural. Somewhat south of Syracuse and Utica, Cazenovia (in Madison County) was a hamlet at the south end of Cazenovia Lake, easternmost of the Finger Lakes. Albert Nelson Prentiss (Fig. 1) was born on a farm there, and after the local schools attended the Oneida Conference Seminary, a private school supported by the Methodist Church but educationally nonsectarian and a pioneer in co-education. Among its more famous graduates were Jesse Truesdell Peck, first president of Syracuse College and Leland Stanford, Jr., founder and endower of the eponymic California college.

The teachers and processes identifying Prentiss as a promising student have been lost, but his family must have supported his enrollment at the Seminary socially and financially, followed by his choosing the Agricultural College of the State of Michigan to further his education. In 1858, some four years before the Morrill Act was enacted into law and at age 23, he enrolled.

For many years before the Civil War there were murmurings aimed at establishing colleges supported by government, either state or federal. In fact, Justin Smith Morrill proposed his bill in the 1850s, but it failed repeatedly. In four years, Michigan took things into its own hands and established the Agricultural College of the State of Michigan. For young Prentiss, it was one of only a very few from which to choose. Over the years its name would be changed to Michigan State College of Agriculture and Mechanics, and finally, in 1964, to Michigan State University.

The Morrill Act (finally passed in 1862) stimulated a surge in college establishment. From 1860 to 1870, 175 new colleges were founded, and "respectable" colleges had at least four science faculty members (Rudolph 1977). In the spirit of the classical education which still dominated college and university curricula, book-reading, recitation, and professorial questions and student answers were the chief means of learning.

The Civil War had begun to rage when Prentiss was awarded a B.S. in 1861. Patriotism for the Union cause was fervent. Of the graduating class of seven, all immediately enlisted in the army.

The timing of his enlistment was delicate. Prentiss was assigned to special signal service in Missouri, but after a few months his unit was dismissed. A major reorganization of the army was taking place in the wake of the dismissal of the commanding general, George T. McClellan. McClellan had been promoted to General-in-Chief of the Union Army, but he and Abraham Lincoln, the new President, distrusted one another and McClellan was the loser. His term as

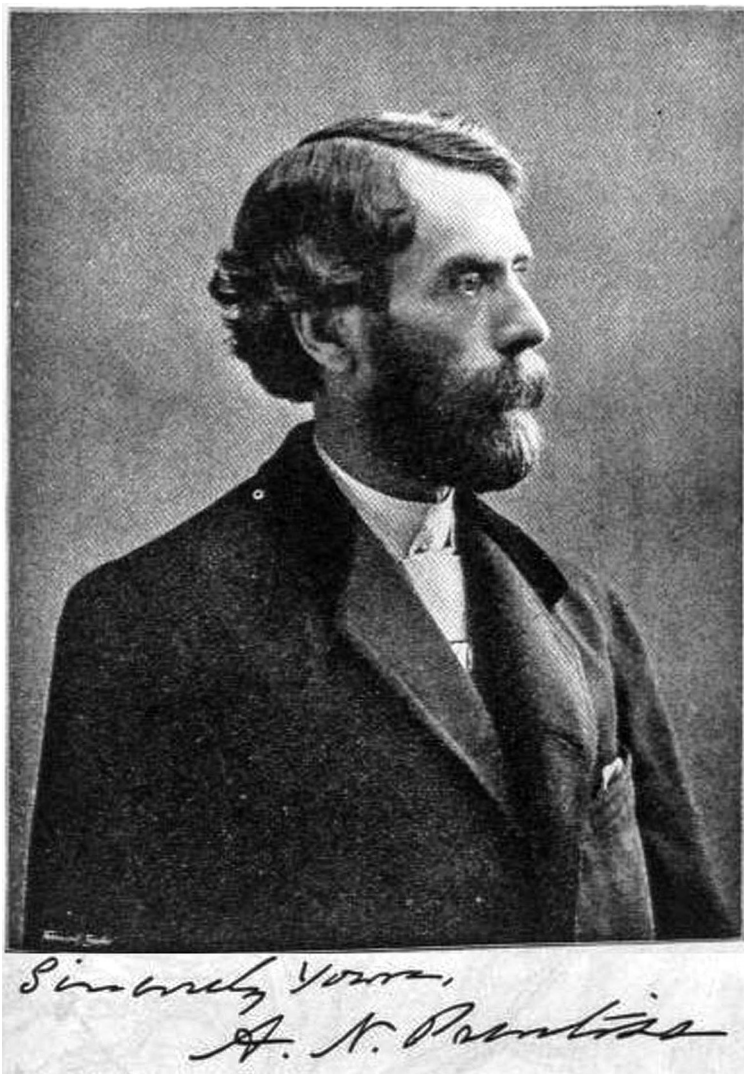


Fig. 1. Albert Nelson Prentiss. Atkinson GF 1896 Botanical Gazette 21: 283–289.

General-in-Chief, November 1861, to March 1862, coincided with Prentiss's enlistment. Prentiss was sent home to Cazenovia.

Possibly through contacts made at Michigan State, Prentiss spent the academic year 1862–63 as associate principal of Kalamazoo High School,

Michigan, not far from his alma mater. By the fall of 1863, he was listed on the faculty of Michigan State Department of Horticulture. Concurrent with his official duties, he earned an M.S. in 1864, and in 1865 he became Professor of Horticulture and Botany as well as Director of Grounds.

Albert Prentiss had been raised in an agrarian lifestyle, left home, been a college student, survived boot camp, and now, at 32, put all these to practice as a professor—and director of grounds. His total time on faculty was to be five years.

For some notable students of Prentiss at Michigan State University, see Appendix 1. One, Charles Edwin Bessey, progressed into a pivotal career as an innovator of botanical pedagogy.

In the early third of the nineteenth century the de facto controversy for botany was the "Linnaean System" versus the "Natural System." The former used a formulaic system locating and numbering flower parts to arrive at the name assigned to the plant in question. The "Natural System" relied on more information—habit, ecology, physiology, anatomy, etc.—in order to place plants in "natural" groups (Sundberg 2011). The chief disciples were Amos Eaton (Linnaean System) and Asa Gray (Natural System), but the modes of teaching were consistent.

Compared to the reading–recitation–lecture-centric teaching of botany in mid-19th century America, quite a different approach was developing on the European continent, particularly in Germany. As early as 1849, the second edition of Schleiden's botanical textbook, which strongly emphasized cellular and anatomical studies, was translated into English. In the early 1860s, Hofmeister published his 4-volume work *Handbuch der Physiologische Botanik*, soon considered one of two game-changers in biological thinking. The other was Darwin's *On the Origin of Species* (Green 1967).

At Harvard, William Gilson Farlow was a student in botany. Upon graduation and on the advice of Prof. Asa Gray, Farlow enrolled in the medical school and in 1872 was awarded his M.D. Again with advice from Gray, Farlow embarked for Europe for what became a two-year absence. As well as studying with Anton de Bary in Strasbourg and using some of his family wealth to purchase books and herbaria, Farlow observed that European botany students were better prepared than those in the United States for entering into hands-on learning. Part of this was the early introduction of botany in preparatory school curricula as well as the wide use of living plants and laboratory observation where students could participate with the teacher in the subjects covered in lectures. In short, in the classroom, students and teachers were partners.

In 1866, Charles Bessey (see Appendix 1), who entered Michigan Agricultural University intending to become an engineer, also took courses in botany from Prof. Prentiss. The sole botany classroom contained a large glass cabinet housing the "Ross compound microscope." Bessey later related the story of his epiphany in pedagogy. "It was never taken out for use in class, but always stood there as a challenge to us. I do not know what anyone else did, but at last I could stand it no longer, and getting permission from Professor Prentiss, who gave me the key to the case, I locked myself in the classroom, and taking out the ponderous instrument, looked it over, studied its complex machinery, and made myself familiar with its structure and use" (Bessey 1913). Bessey completed his B.S. degree in November 1869 and began his first faculty position the next month at Iowa Agricultural College in Ames. Following his Michigan experience, he started bringing simple experiments into the lab, most centering on histological manipulation and use of a microscope. He soon became an evangelist for a new teaching philosophy for botany.

Meanwhile, in Ithaca, New York, conversations were taking place concerning the possible founding of a college. Several well-placed men were involved, of whom one was Ezra Cornell.

Two members of the state senate, Andrew Dickson White (1832–1918) of Syracuse and Ezra Cornell (1807–74) of Ithaca, emerged from different generations and backgrounds but shared an interest in establishing a college in New York State. Cornell, a journeyman carpenter by trade but by this time in late middle-age, had made a respectable fortune in the telegraph industry and owned an estate and model farm in Ithaca. White was a son of a wealthy banking family. Educated at Yale and part of "the famous class of 1853," he had travelled widely in Europe and had been a professor of English and history at the University of Michigan (not Michigan State). Cornell's offer to deed his farm to a college established in Ithaca and to contribute $500,000 to the cause furnished a target location. In 1862, the Morrill Act afforded an opportunity to see their concept come to life on behalf of New York State.

The impecunious federal government could not award monetary funds to back the terms of the Morrill Act and allotments to the states was by scrip, a promissory note for federally owned land. Each land grant was in proportion to the number of representatives (and therefore, the population) of each state. Under the canny influence of Cornell, New York chose 989,920 acres of timberland in western Wisconsin Territory (the eastern portion had become a state in 1848), with a value of about $2.5 million in mid-19th century funds.

The land grant, together with the munificent Cornell monetary donation and Cornell's farm were enough to fund a modest college.

Cornell University was founded on 27 April 1865. After spirited debate the university was named for its benefactor, and its first president was Andrew Dickson White. But merely to pronounce the existence of a college did not magically produce staff, buildings, or curriculum—much less students and income.

Now the difficult tasks commenced. During the next three years, White saw to the construction of the first two buildings and travelled to recruit students and faculty. It was planned that the University should start with 26 professors split between resident and non-resident faculty. The non-resident faculty would be famous personages in their respective fields, and their recommendations would be influential in recruiting the resident faculty and advertising the college. One such non-resident was Louis Agassiz, the celebrated natural science magnate at Harvard. Between Agassiz and White, an offer was made to Albert Prentiss of Michigan State, who was approved at the eighth meeting of the trustees on the very day of the university's opening, 6 October 1868. Prentiss was already in Ithaca, ready to assume the position of Chair of Botany, Agriculture and Horticulture and Director of Buildings and Grounds. The following day, 412 male students were enrolled, just a few months after Andrew Johnson, President of the United States, had been impeached.

The contrast between bucolic Ithaca and urbane New York City was stark. New York City, for example grew from 500,000 in about 1825 to just less than a million by 1870. Growing pains also increased. It was said that a lady in lower Manhattan could wait a half-hour to cross the street, so crowded was the traffic. The first elevated railway was opened on 2 July 1868, running between the Battery and Cortlandt Street, just some two months before Cornell opened its doors. With steam propulsion, the trains moved between five and 10 miles per hour. The system was extended, but its pollution and noise were oppressive and calls for some other system became politically exigent.

According to Atkinson (1896 a,b) Prentiss's course in General Botany opened with four students, but the following year enrollment was 144. For three years, physical space was "borrowed" from chemistry. Over the years the students in Prentiss's classes, through his influence, became interested in the local flora; students included David S. Jordan (later President of Leland Stanford Jr. University in California), J.C. Branner (later Ph.D. botanist) and William R. Dudley (later professor at Cornell and then Stanford). The first

careful flora of the region was compiled by Prentiss and published by Dudley after Prentiss's death.

Just as had been the case at Michigan State, the job of overseeing buildings and grounds took inordinate time. In a memorial article years later upon Prentiss's death, the Cornell Daily Sun (Anonymous 1896) wrote: "He showed great enthusiasm in organizing the work under the very adverse conditions which prevailed for the time and for several years. He planned early for beautifying the campus by planting seeds in the fall of 1868, of a number of kinds of trees for a nursery. Many trees from the nursery were planted over the campus, but nearly all have been destroyed by subsequent grading for new buildings."

Prentiss met his classes and researched the flora of the surrounding countryside but in 1870, he accompanied Prof. C.F. Hartt on an expedition to Brazil (organized by Hartt but henceforth known as the "Morgan Expedition" after its chief underwriter). With a number of students, they pushed off from New York in late June, returning early in January 1871. The party made collections in natural history and studied the natural resources of the country along the course of the Amazon to about 400 miles above Pará, as well as along the rivers Chingu and Tapajos, two of the principal tributaries of the Amazon. There was time enough to see Rio de Janeiro. Drawing on this trip into the tropics, Prentiss wrote an essay in 1871, "Mode of the natural distribution of plants over the surface of the earth," which won the first Walker prize offered (and published) by the Boston Society of Natural History. But in contrast, he also wrote an extended monograph of the hemlock (*Tsuga* spp.) for the United States Department of Agriculture (USDA) Division of Forestry. That same year the Chicago Fire (with almost one third of the city consumed) dominated headlines.

In these years, American academics were coming to appreciate the breakthroughs produced in European laboratories. It became relatively common, although expensive, to travel to Europe to work with a leading researcher and to visit the premier institutions in the capitals. Prentiss spent six months in 1872, visiting the Royal Botanic Garden at Kew, the Jardin des Plantes in Paris, and several other important botanic gardens. His facility with French was helpful. In a matter of three years he had experienced the biota, ecology, and peoples of the American tropics as well as the sophistication of European science and lifestyle, both a long way from Cazenovia, New York.

As if the Chicago Fire wasn't sensational enough, the 1872 Boston Fire seemed apocalyptic. Completely separate, though, when Prentiss returned to

upstate New York, Cornell, too, was a remarkably different place than the one he had left. Economic collapse was on the horizon.

The Civil War had been followed by a boom in railroad construction. Like the canal craze of a previous half-century, development of railroads had exploded. Between 1868 and 1872, 33,000 miles of new track were laid across the country. Much of the railroad investment craze was driven by government land grants and subsidies, this time to the railroad corporations. The railroad industry, including its manufacturing and shipping support, was the nation's largest employer outside of agriculture, and involved generous amounts of money and risk, especially bartered in the money markets of the northeast. The result was over-development of those very supporting factories, warehouses, and other ancillary facilities. A large infusion of cash from speculators caused even more abnormal growth. In modern parlance, a bloated "bubble" burst in "the panic of 1873." To be sure, the panic followed a series of economic scares including removal of silver as a denomination of coinage. The result was catastrophic: unemployment became acute and banks failed, creating a general economic crisis, with colleges and universities particularly threatened.

Cornell was not exempt. Student enrollment decreased. Faculty salaries came under attack. Teaching loads increased while research was expendable. The "Great Depression of 1873–77" cast a pall over campus.

As though bringing the mountain to Mohammed, in 1872 the AAAS met in Dubuque, Iowa, where Charles Bessey met Asa Gray, the presiding President. They arranged for Bessey to spend his 3-month winter break at Harvard, where in addition to Gray, he would also work with George Goodale, a physiologist, and study fungi and systematic botany. The following semester, back in Ames, he moved a table, one microscope, and a few reagent jars into a small room at the end of a corridor with a sign over the door—"Botanical Laboratory." Bessey claimed that this was the "First botanical laboratory outside of Harvard" (Sundberg 2012). (1872 also saw Susan B. Anthony, a Quaker, jailed for protesting for women's suffrage.)

At Iowa State, unlike eastern universities, a significant amount of the curriculum was science, with a full year of botany required in the sophomore year (Beal 1908). Bessey later recalled that "with the possible exception of Harvard, this college [Iowa State] then gave the most extended and thorough course in botany in this country" (Bessey 1913). The first term of the junior year was split between vegetable physiology, economic botany, and cryptogamic botany—all making use of the herbarium and college microscopes (Pool 1934–35). Within two years, seven compound microscopes were provided.

Four years afterward, in 1880, there were 11 compound scopes in a new building with a large botanical laboratory on the first floor. Still three years later, the lab had 21 student compound microscopes and a "first class microscope, with accessory apparatus, and high-power objectives" (Pool 1934–35). Bessey later took pride in recalling that the administration and his faculty colleagues believed "that the professor of botany was slightly 'queered' or out of his head when the subject of microscopes was under discussion" (Sundberg 2012).

The laboratory as part of instruction became Bessey's trademark. While a visiting professor at the University of California in 1874–75, he introduced botany students to the laboratory method, doing the same during a visit to Minnesota in 1881, where he offered a summer school botany course for teachers (Bessey 1881). By 1885, a dozen colleges had botanical laboratories equipped with microscopes for student use (Arthur 1885).

Asa Gray had inaugurated a summer course for teachers and others in 1872 (Pfister 2010), and now, in 1874, Farlow returned from Europe with ideas about hands-on teaching. Later in October that same year, the star of the Exposition Universelle in Paris, Gustave Eiffel's Tower, was the wonder of the world. It was also the year that George Goodale offered a winter course for teachers on how to teach botany (Goodale 1879; Bessey 1880a). The course intended to teach teachers how to stimulate students to learn for themselves. This was accomplished by using interesting and attractive living plants, asking leading questions to guide the student's inquiry, and answering only questions that the student could not answer for him(her)self with direct observation.

In 1878, Albert Prentiss married Adaline Eldred. The couple had no children, so Adaline was able to accompany Albert in many of his travels. During the ensuing years, teaching continued and departmental and physical plant administration consumed inordinate time while new students arrived, some of whom were encouraged in their botanical studies.

In Iowa, Bessey's new textbook, *Botany for High Schools and Colleges* (Bessey 1880a), was one of the first emphasizing "the new botany" in America, a term coined by Beal (1879) at Michigan Agricultural College, but soon taken up by other, mostly younger, midwestern botanists including Bessey, J.C. Arthur (Bessey's undergraduate and Master's student), and their mutual friend John M. Coulter at Wabash College. The book sold out within six months and went through a large reprinted edition. Pressed by his publisher for a book aimed at even younger children, Bessey (1884) published *The Essentials of Botany.* Both books were lavishly illustrated.

Back at Harvard, Goodale (1879), the physiologist, published a paper to aid in teaching botany. The paper covered a few common plants. Shortly thereafter, J.C. Arthur (1880) published the first teaching paper in an American botanical journal, suggesting that pumpkin was a most useful example of a dicot stem to use in the laboratory classroom. Two years later, Bessey suggested that asparagus stem was an optimal monocot for teaching (Bessey 1882), and Arthur (1885) further endorsed the laboratory experience as well.

As might be expected, at Cornell Prentiss oversaw the botanical training of some notable students bound for greater lives (Appendix 2). In 1874, William Russel Dudley (see Chapter 3) was awarded his bachelor's degree. Finding employment loomed as a major problem but Dudley had already assisted Prentiss in the introductory course because much of Prentiss's time was taken up with campus construction and beautification. Dudley remained in the botany department as an instructor, relieving Prentiss of the introductory courses until leaving Cornell in 1893 for a professorship at Leland Stanford Jr. University in California.

George Francis Atkinson was another student of the Prentiss era. Originally from rural Michigan, Atkinson transferred to Cornell as an undergraduate in about 1883. His botanical education was probably shared by Prentiss and Dudley. At any rate, Atkinson was awarded his B.Phil. in 1885. As Dudley before him, Atkinson was made an assistant to Prentiss. After graduation he pushed off from Cornell for some years on faculty at some southern schools (see Petersen 2019, p.71), only to return thereafter.

How William Ashbrook Kellerman from Ohio came to entertain ideas of college is unknown, but the funds for matriculation at Cornell were found and he probably entered in 1870, for he graduated in 1874, only six years after the establishment of the University. Prentiss was away in the Amazon and again in Europe for three of Kellerman's Cornell years. Nonetheless, Prentiss was department head, and Kellerman was likely to have had classes with him. Chances are better that he rubbed shoulders with fellow student William Dudley. Kellerman was to embark on a celebrated career in Kansas followed by Ohio (and death by malaria during fieldwork in Guatemala).

Mason Blanchard Thomas, a young man from New Woodstock, New York, came to Cornell in 1886, graduated with a B.S. in 1890, and remained for graduate studies. In 1891, however, he accepted an appointment as professor at Wabash College in Crawfordsville, Indiana (see Chapter 4).

In November of 1884, Bessey left Iowa State University to become Professor of Botany and Horticulture and Dean of the Industrial College at the University

of Nebraska. He vowed that the program at Nebraska would not "still regard botany as a pleasant pastime consisting mainly of flower hunting..." or where "the scientific botanist was one who collected, dried, and pressed into dead flatness the plants of his neighborhood, only to attach to them afterword [sic] certain Latin names...." (Bessey 1885; Sundberg 2012).

In 1886, Gustave Eiffel again came to the attention of Americans. Although Frédéric Bartholdi sculpted the Statue of Liberty, it was Eiffel who designed its steel framework. The statue was paid for by French people and positioned on Bedloe's Island on a pedestal financed by Americans. Dedicated in October in New York Harbor, it was celebrated by the first tickertape parade up Fifth Avenue.

Atkinson (1896a): "During the later years, failing health, while it did not prevent [Prentiss] from attendance upon the duties of instruction and administration of his office, did not leave him sufficient reserve strength for the close and continued application necessary in conducting extended experiments or prolonged research."

In 1896, Prentiss died at 60 years old. At Cornell's Sage Chapel there is a plaque that reads "In memory of Albert Nelson Prentiss M.S. First Professor of Botany at Cornell University 1868-1896. Born May 22, 1836. Died August 14, 1896. A noble man, a devoted scientist, a faithful teacher." A note in the Cornell Sun read: "While Professor Prentiss never manifested any great enthusiasm himself, he could arouse more enthusiasm in a student, and get more work out of him, than any man I ever knew."

A piece in Gardening Magazine reported: "At Prentiss's death (1896) the Cornell botany department had the following personnel: Geo F. Atkinson, Ph.D. [sic] professor of botany; W.W. Rowlee, B.L., D.Sci, assistant professor of botany; E.J. Durand, A.B., D.Sci., instructor in botany; K.M. Wiegand, B.Sci., assistant in botany; B.M. Duggar, A.B., A.M., assistant in charge of experiment station botany; Robert Shaw, head gardener, in charge of conservatories, W.A. Murrill, B.Sc., Virginia Agr. College, scholar in botany." Twenty-eight years previously, Prentiss had arrived as a department of one.

Chapter 3. William Russel Dudley (1 March 1841–4 June 1911)

Guilford, Connecticut, on Long Island Sound some miles east of New Haven, was home territory for the Dudley family since colonial times. William Russel Dudley (Fig. 2) was born and raised on a family farm, and reports from later

years indicate that the family might have been landed but was not aristocratic. His early schooling has not been uncovered but he took interest in nature, especially the flowering plants that surrounded him. Although other colleges were considered, he chose Cornell for its emphasis on science. He arrived there in 1870 (age 29), sought out the botany department, and there made friends with fellow student David Starr Jordan, Assistant to Professor Prentiss. Many years later Jordan would describe his new friend as: "a tall, well-built, handsome and refined young man, older and more mature than most freshmen, and with more serious and definite purposes" (Anonymous 1913). Immediately, Dudley set out to explore his new environment, including collecting fungi (Cooke 1956). As it turned out, he and Jordan roomed together for the following years and soon made joint field trips.

Dudley paid his way at Cornell by milking cows at the university farm. He and Jordan roomed in a small cabin near the small campus and soon a small cadre of aspiring botanists gathered, some destined to become notable academics in their own right.

In 1870, just as Dudley arrived at Cornell, construction began in New York City on a bridge between suburban Brooklyn to business-centric Manhattan. It was called the New York Brooklyn Bridge, but the name would be shortened to The Brooklyn Bridge.

Although words of eulogy may be discounted by circumstances, even in his youth Dudley was consistently described by preciseness, purity of thought and intention (particularly in the last decades at Stanford), but as stated by Jared Treman Newman (Anonymous 1913): "Of fine New England stock, cultured, with a refinement that was genuine all the way thorough, doing splendid work in his chosen profession and capable of making a great name for himself, his best service to the world was in imparting to other men higher aspirations and nobler ideals."

Dudley impressed his new friend Jordan by his attitude and growing knowledge and, when Jordan moved on, Dudley was selected in his sophomore year as Jordan's replacement as Assistant to Prof. Prentiss. He served in that capacity for Prentiss's course in fungi for four years, qualifying him to be listed as a mycologist many years later.

Graduating in 1874 with a B.A., Dudley stayed on, enrolling for graduate studies. In 1875, he spent the summer on Penikese Island, a tiny plot off the south coast of Massachusetts, taking a field course from Louis Agassiz, Harvard University's famous zoologist. This was the first American field course located in the midst of the material to be studied and was an early model for the Marine

Fig. 2. William Russel Dudley. Dudley Memorial Volume, Stanford University. 1913.

Biological Laboratory at Woods Hole, Massachusetts, founded in 1888. Dudley returned to the island in 1876, just after receiving an M.A. from Cornell and a

promotion to Assistant Professor of Botany. The island was to become a leper colony in the 20th century. In 1878–79 Dudley served as Professor of Botany at the Martha's Vineyard Summer Institute.

A year later, his old roommate, David Jordan, by now President of the University of Indiana, was scheduled for a leave and asked Dudley to substitute for his teaching responsibilities. Dudley complied, taking leave from Cornell. But Jordan was not finished with him. John Casper Branner (Anonymous 1913) related: "When Dr. Jordan was President of the University of Indiana, he tried for some time to induce Dudley to go to that institution as professor of botany. And I recall in this connection that Dr. Jordan said to me on one occasion: 'Quite aside from his ability as a teacher of botany we need him here on account of his personal influence.' But Dudley declined the proffered position largely because he felt that he was not altogether fitted for the pioneer work required there at that time."

As if to express American exceptionalism, John A. Roebling's masterpiece, the Brooklyn Bridge, was opened for traffic on 24 May 1883, far away from the rural areas producing the academic centers of this narrative. As a reminder, popular, affordable internal-combustion automobiles were still 30 years in the future. Some lives would be lost in its construction, but the bridge was to stand as a monument for over a century and still acts as a prime artery, now by vehicle and foot traffic. It was a structure to be admired (and scams still offer it for sale). That same year, Dudley was again promoted, this time to Assistant Professor of Cryptogamic Botany, reflecting his experience teaching the mycology course.

In 1886, he went out of character, publishing three biographical sketches of mycologists in *Journal of Mycology*, edited by his Cornell student friend William Ashbrook Kellerman: "A sketch of [Moses Ashley] Curtis;" "Elias Magnus Fries;" and "Charles Christopher Frost." These sketches had been advertised by Kellerman at the end of volume 1. As the years passed, Dudley remained at Cornell, now on the faculty of a growing department. In 1887, like Prentiss before him, Dudley travelled to Strasbourg in Europe to work with Anton de Bary, who was experimenting with plant and fungus physiology. When de Bary died the following year, Dudley wrote a eulogy in Botanical Gazette.

1888 was a year of change for Cornell's botany department. Liberty Hyde Bailey, Asa Gray's last student and a horticulturalist intent upon taking botanical—largely agricultural—knowledge from the lecture hall and academic laboratory to the practicing public engaged in agricultural pursuits, entered the botany department through Cornell's Agricultural Experiment

Station in Geneva, New York. While Bailey's vigor enlivened the personnel, it also roiled the routine of teaching and research. 1888 was also noted for the death of Asa Gray.

David Jordan moved again, this time as President of the brand-new Leland Stanford Jr. University (later shortened to Stanford) in Los Altos, California. He renewed his effort to bring Dudley on board, and this time Dudley was listening. Dudley's last paper written at Cornell, "Flora of the Lackawanna and Wyoming Valleys; a catalogue of the flowering plants and vascular Cryptogams found in and near Lackawanna and Wyoming Valleys," (published privately with Charles O. Thurston from Wilkes-Barre, Pennsylvania) appeared as he made the decision to move.

Dudley's years at Stanford go beyond the current narrative. In time he became deeply involved with California forestry and especially with the conservation of archetype forests. He fought for, and won, the state's purchase of 2500 acres of prime redwood forest now known as Big Basin Redwoods State Park. David Jordan (Anonymous 1913) related: "Professor Dudley's health was good until about three years ago, when he set out to study the trees of Persia [the vast stretch of land from Egypt to Pakistan, centering in Iran; what is known now as "the Middle East"]. In Egypt he was attacked by a severe cold or bronchitis which ended in tuberculosis." Jordan's grace note: "He never married." Dudley died 4 June 1911, in Los Altos.

John Casper Branner on Dudley (Anonymous 1913): "In the latter part of his life certain of his traits became more prominent than during his younger manhood. He was always, and of necessity, a purist in every sense in which that word can be used. But as he grew older I imagine that his sensitiveness brought him more pain than pleasure, and to this I attribute the rather lonely life he led after coming to California."

Jared Treman Newman on Dudley (Anonymous 1913): "Like many noble souls, he was peculiarly sensitive. He was hurt often when no hurt was intended. He was often melancholy, sometimes almost morbid. It has always seemed so strange that one who gave so much and so constantly should not be always happy. Perhaps he made up for it in the intensity of his joys. While he was often misunderstood and while the number of persons who came close to him was not relatively large, yet few men have merited, or have known, in so large a degree, the love of their fellows."

A list of notable students that passed through Dudley's aura at Cornell appears here in Appendix 3. A similar list of such students at Stanford (Anonymous 1913) is easily three times the Cornell list.

Chapter 4. Mason Blanchard Thomas
(16 December 1866–6 March 1912)

Born in 1866 in New Woodstock, New York about 25 miles southeast of Syracuse and just a few miles due south of Cazenovia and the birthplace of Albert Nelson Prentiss (born: 1835), it would be years before Prentiss would meet Mason Blanchard Thomas at Cornell.

Thomas (Fig. 3) prepared at Cazenovia Academy (probably a lapsus by Kent 1979, for the Cazenovia Seminary), 6 miles north of New Woodstock. In those years, to recruit new, qualified students, Cornell ran a program of competitive scholarships carrying stipends to defray expenses. Thomas won one of them and enrolled in Fall 1886. According to Kent (1979): "It is unclear why he chose to study botany."

Although Albert Prentiss was Botany Department Head, Thomas began early to work with William R. Dudley, at that time establishing his own course in histology. Dudley was an experienced and inspiring teacher, as well as a half-time investigator of plant disease in the Cornell Experiment Station. He was a proponent of understanding disease through laboratory analysis, particularly histological examination, joining the movement of bringing the laboratory into the classroom. Years later, this relationship bore fruit as "A laboratory manual of plant histology" (Thomas & Dudley 1894), even though both authors had gone their separate ways. Through Dudley, Thomas became acquainted and worked with microscopist Dr. Simon Henry Gage.

Awarded a B.A. in 1890, Thomas immediately enrolled in graduate studies aiming for a Ph.D., but the Cornell fellowship he occupied at that time expired in nine months, with no other predictable means of livelihood. So it was not Thomas's first choice when in the fall of 1891, he was offered and accepted a faculty position at Wabash College in far-off Crawfordsville, Indiana. He must have come with high recommendations: the position was as the Rose Professor of Biology and Geology, and he replaced John M. Coulter, one of the champions of laboratory-centered learning who left Wabash to become President of Indiana University. Thomas was 25 years old.

The contrast between Cornell, its location, student body, faculty, and campus, and Wabash College, with about 200 students, 15-20 faculty, and unkempt grounds, was stark, but as later reported, Thomas "hit the road running." The quality of Wabash students was high. For entry into the collegiate program, solid academics were required, including preparation in Latin and Greek. Wabash was the quintessential small liberal arts college, and students received a great deal of individual attention in small classes. According to

Fig. 3. Mason Blanchard Thomas. The Wabash Ambassador. 1969 vol.3(2): unpaged.

Kent (1979): "in his first year at Wabash, Thomas's remarkable energy and his interest in students led him to become coach of the new football team. During a practice session he received a knee injury which ended his coaching career,

caused him continual pain, and necessitated use of a cane for the rest of his life."

Most of the students were from the present-day mid-west and came to Wabash with no intention of studying biology. Many of Thomas's students reported how he advised them to take his general course, then encouraged them to major with him, and, finally, directed them to graduate school.

Lexemuel Hesler's description (Petersen 1979) of his first encounter with Thomas mirrored that of many students. As told in the third person, "… he entered Wabash College with the intention of transferring to Purdue University for a degree in Civil Engineering. After two years, however, his goal changed to botany. He recalls that at registration in the Fall Quarter at Wabash in 1907, his course of study was prepared by Professor Mason B. Thomas. He found Thomas a magnetic and persuasive personality, which resulted in Hesler being signed up to take freshman botany. His performance in Thomas's course that year scarcely sparkled. A conference which Hesler had sought with Thomas at the end of the first quarter opened a new understanding by this freshman as to what college was, and what it took to do profitable college classwork. Things were now to change for the better. However, in the following year [junior], he met another student, one Jacob R. Schramm [Wabash class '10, one year ahead of Hesler; see Appendix 4; Table 1)]. Soon Hesler's professional life-plan was well laid by the designers Thomas and Schramm. In this plan was Hesler's assignment to assist Schramm at the Woods Hole Biological Station, in Massachusetts, during the summer of 1909; and the next summer (1910) he was placed in the field station at Sodus, New York, on the recommendation of H.H. Whetzel, Wabash '02' [by then on faculty at Cornell]. This move resulted in Hesler's appointment to a fellowship the following January 1911, at Cornell. At Cornell, Hesler held the fellowship in Plant Pathology."

In 1892, only a year after Thomas's arrival at Crawfordsville, campus gossip was rivaled by different news headlines. Negotiations were underway to designate a location for an exposition commemorating the 400th anniversary of Columbus's arrival in the "New World." Two cities led the competition, New York and Chicago. The New York bid seemed insurmountable, backed by the likes of J.P. Morgan, Cornelius Vanderbilt, and William Waldorf Astor. Chicago's bid was underwritten by Charles T. Yerkes, Marshall Field, Philip Armour, Gustavus Swift, and Cyrus McCormick among others. The final straw came when Lyman Gage, the Chicago Banker, raised over a million dollars in 24 hours to top New York's bid. The "Windy City" site was finalized.

The site was to be grand, with lakes, ornate buildings, and participation by many nations up and down the Americas. Its title was World's Fair: Columbian Exposition. In all, 46 countries participated, each advertising its own society, culture, products, and beauty. State exhibits included California, Connecticut, Florida, Illinois, Louisiana, Massachusetts, New Jersey, New York, Pennsylvania, and Texas.

Fourteen "great buildings" were included. Among them were Agriculture, Forestry, and Horticulture. William Ashbrook Kellerman, a former Prentiss/Dudley student at Cornell (see Appendices 2, 3) and by 1893 the botany department head at Ohio State, mounted an exhibit of Ohio timber trees. Charles Horton Peck, State Botanist for New York, brought numerous ceramic models of mushrooms and other fungi. Joseph Charles Arthur, from Purdue, exhibited a physiological apparatus of original design, "receiving medals and diplomas." (Lloyd 1920). The agriculture building included displays of U.S. Department of Agriculture-aided crops and new motorized technology for the farm.

The exposition was dedicated 1 October 1892 and opened to the public 1 May 1893. During its six-month life, over 21 million people went through the turnstiles. It was a headline-stealer and a living symbol of the resilience of Chicago after its disastrous fire of 1871.

Inspired by the Fair's exhibitions, William Powell Wilson, once a Prentiss student at Michigan State (see Appendix 1) saw an opportunity. Wilson imagined a permanent commercial museum with exhibits along the style of those at the Exposition. Perhaps exhibits from Chicago could serve as the beginning. Already a botany professor on faculty at the University of Pennsylvania, he quickly returned to Philadelphia and floated the concept through local authorities. Armed with official approval and adequate funding, Wilson returned to the Fair and persuaded several Central and South American countries to sell their Exposition exhibits to his yet-to-be-housed museum. The concept was a success, the museum grew and eventually moved to a building of its own, which it occupied until its closure in 1994. Wilson spent the rest of his career searching out exhibits for the Philadelphia Commercial Museum, an occupation which made him a respected international statesman.

To resume the interrupted narrative, in 1893, Mason Thomas, age 27, married Anne Davidson, a young lady from Crawfordsville, who shared his warm personal relationships with students. Even after Thomas's death she retained the affection of many Wabash students. The Thomases had no children (Kent 1979).

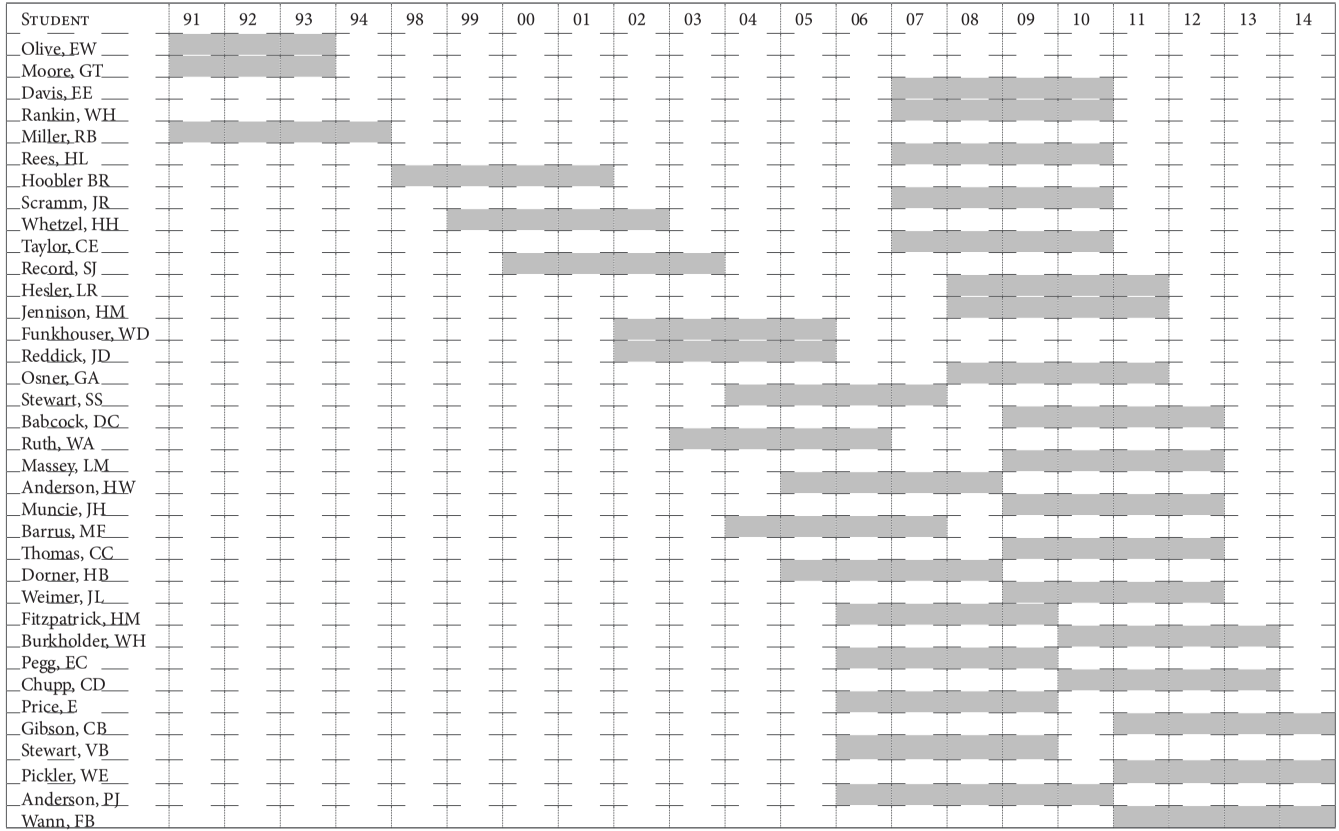
In response to student popularity in the natural sciences at Wabash, botany was divided in 1895. Thomas was titled Professor of Botany, with Dr. Donaldson Bodine as Professor of Biology and Geology. The two complimented each other in pedagogical philosophy and they became fast friends.

Perhaps as evidence of his energy, Thomas was sometimes viewed as a gadfly. He vociferously carped on the poor appearance of the campus grounds, and so in 1897, in a common administrative tactic, he was appointed by the President to oversee the buildings and grounds. Thomas promptly persuaded the Executive Committee of the Trustees to bring in a landscape architect to develop a landscaping plan for the campus. It was his first formal attempt at administration.

As the growth of urban New York City was contrasted to the opening of Cornell University in 1868, the first quarter of the 20th century saw the first operational underground rapid transit system. Two private companies pioneered the construction, and the first New York city transit route opened in 1904. By 1913, the City took over new construction, leasing the routes and stations to the companies. Apace, Chicago opened its "L" (elevated rapid transit system) where four routes and four companies began service between 1892 and 1900. Whether measurements were based on geographic area, population, residence density, gross domestic product, the arts, or pollution and general filth, at every turn, the dominant cities grew and thrived usually with little knowledge or opinion about rural, agrarian conditions over the horizon.

During the ensuing years, Mason Thomas's reputation grew, both as teacher/mentor and effective administrator. A list alone cannot cover the duties and roles as well as the esteem given him. Associate Editor of the Proceedings of the Indiana Academy of Sciences, 1899–1900, followed by the Presidency, 1900–01; fellow of the American Association for the Advancement of Science and appointment to its Counsel; Secretary of the Indiana Forestry Association and Chairman of its Education Committee; Member of the Corporation of the Marine Biological Laboratory at Woods Hole, Massachusetts. Almost tangential was his interest in the Boys School of Plainfield, Indiana, for which he served as Secretary of the Board of Trustees. His performance in all roles led to his appointment as Dean of Faculty in 1907, in addition to his regular departmental responsibilities, over which he remained head until 1908 as a faculty of one. His mentored students kept pace, with most graduating during 1905–1914 (two years after his death; Table 1). Wabash appreciated his role in the College and in 1907, awarded him an honorary LL.D. degree.

Table 1. Thomas students and their times at Wabash College, 1891–1914



In January 1912, Thomas became ill and was confined to bed with what was diagnosed as severe pleurisy, an infection of the membranes surrounding the lungs. For two weeks he continued to conduct classes at his bedside. As he continued to decline, his former student, Dr. B.R. Hoobler (see Appendix 4; Table 1) came to Crawfordsville to assist in his treatment. Thomas died on 6 March 1912, at age 45. As written by Kent (1979): "At the turn of the century, one of the outstanding teachers of botany in the United States was Mason Blanchard Thomas at Wabash College."

Memorials and obituaries for Thomas were several (Anonymous 1912a,b; Mills 1912). From his first year at Wabash to his last, Thomas selected and mentored students and propelled them toward more significant goals. An annotated list offered by Kent (1979) appears as Appendix 4.

Chapter 5. Herbert Hice Whetzel (5 September 1877–30 November 1944)

As might be expected, excitement over the "New Botany" pedagogical innovations led to some differences of opinion. This dichotomy played out in microcosm at Cornell, with the conservative Albert Prentiss as its botany head in the College of Liberal Arts followed by George Atkinson, and the later Liberty Hyde Bailey's more energetic State College of Agriculture with its version of a Botany Department (soon renamed). Bessey, John Coulter, J.C. Arthur, Dudley, Kellerman, and others were eager to push the discipline forward by promoting botanical education at all levels (Sundberg 2014).

The narration for Herbert Hice Whetzel (Fig. 4) includes, of course, some facts of his life, but the circumstances at Cornell during his graduate student days and those of his retirement from the department headship oblige additional words, for the effects of those academic political episodes were felt throughout the phytopathological, mycological, and academic communities.

Born in Avilla, in the upper east corner of Indiana, Herbert Hice Whetzel (Wabash class of 1902) became a formidable, albeit controversial, force in plant pathology. Of Whetzel's early life little is recorded except that a teacher noted Whetzel's devoted hobby of collecting and preserving botanical specimens and encouraged the young man to extend his education beyond public school (Fitzpatrick 1945). Whetzel graduated from Avilla High School in 1895. Two years of local school teaching followed before he arrived at Wabash College. His choice of Wabash remains oblique, but as the qualifications for entrance were stringent, Whetzel must have been thoroughly prepared, including familiarity with Latin and Greek. There may have been a prior connection to Prof. Mason

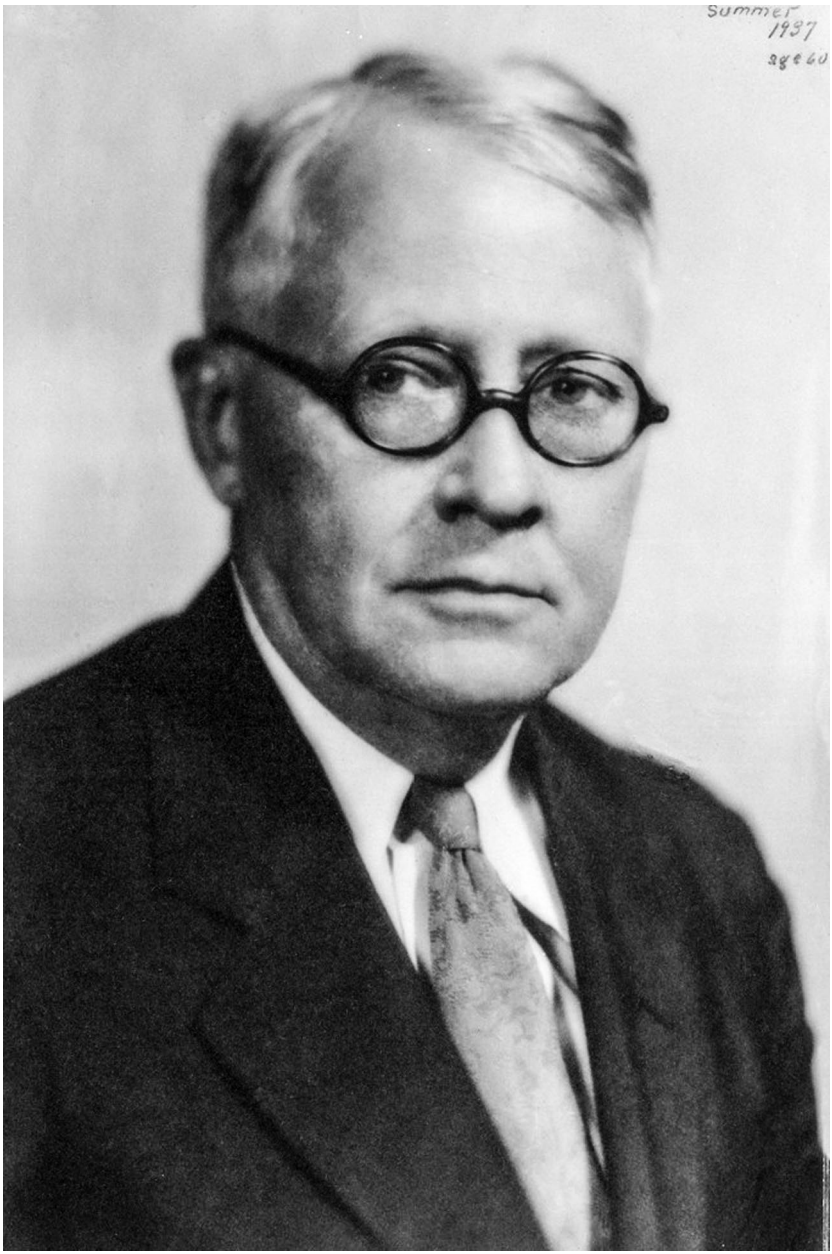


Fig. 4. Herbert Hice Whetzel. L.R. Hesler, pers. comm.

Thomas there, for Whetzel lodged with the Thomases and so had ample time to absorb the professor's magic. A worrisome vision problem led Whetzel to drop out of college for a year, but when he returned, Thomas's previous Cornell experience with and under Prof. W.R. Dudley paid off for Whetzel. As a junior, Thomas arranged for Whetzel to become a summer assistant to George Atkinson, the botanist at Cornell, and that summer Whetzel, Atkinson, and Atkinson's student, Calvin H. Kauffman, collected fungi together.

Whetzel must have excelled at Wabash, for after graduating with a B.A. in the class of 1902, he simply moved on to Ithaca, New York, to become Atkinson's graduate student. Just a decade previously, the Hatch Act had given state colleges the opportunity to fund agricultural experiment stations. For Cornell it only meant additional funds, for its station had been founded in Geneva, New York, a few years before. J.C. Arthur, one "New Botany" advocate, was the botanist at the station. Atkinson's campus appointment in botany also carried responsibilities at the Station, usually carried out by Atkinson's students under his supervision. Whetzel was no exception. Within a year, the celebrated Liberty Hyde Bailey joined the Experiment Station. Graduate student Whetzel was there to see it all.

Whetzel's migration came at a moment when headlines were made in another direction. Just a decade after the Columbian Exposition in Chicago, the anticipated Louisiana Purchase Centennial Exposition was held in St. Louis. Like its predecessor, architecture was grand, with 60 countries and 43 American states represented. Scientific attractions emphasized technology, perhaps reflecting the changing demography from agrarian to urban populations. St. Louis was (and is) considered "The Gateway to the West" and its location on the WEST side of the Mississippi was significant. Some 19.7 million visitors took in the fair, which cost the federal government $15 million dollars.

Whetzel's responsibilities at the Geneva Station brought him into contact with Bailey, who offered him a job as an extension agent, bringing the research from the Station to the farmers who needed it (Fitzpatrick 1945). But Bailey was soon tapped by the New York State administration to establish the New York State College of Agriculture at Cornell University (Colman 1963). Meanwhile, Whetzel was promoted to Assistant Professor in the Liberal Arts botany department. The new College, however, also planned a department of botany, awkward since Atkinson's botany department already existed. The solution to the naming problem came in two phases: [1] Bailey offered Whetzel a new job as Assistant Professor and Head in the new department, so for some time he would be on faculty in two botany departments in two

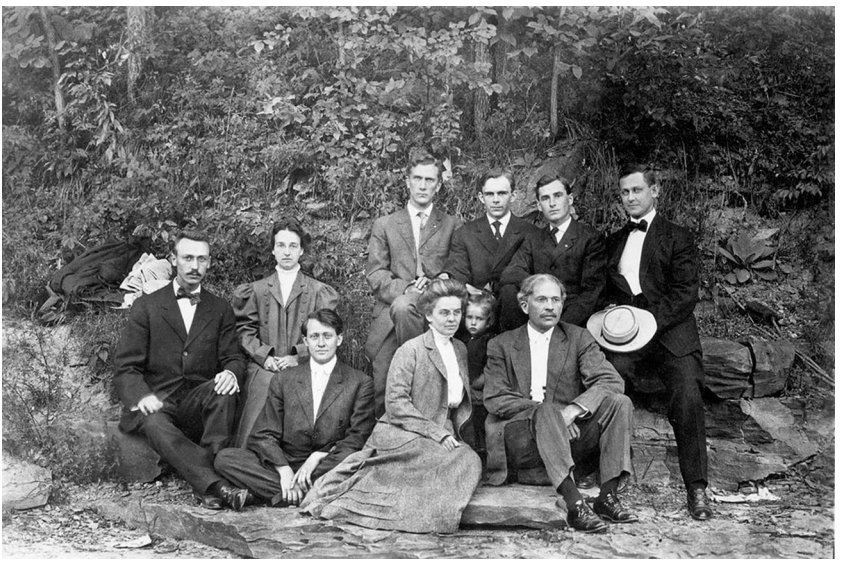


Fig. 5. Reunion of Wabash graduates at Cornell University, 1908. Left to right: Donald Reddick, Mrs. Whetzel, Prof. Herbert Whetzel, Earl Price, Mrs. Thomas, young Gertrude Whetzel, Harry Fitzpatrick, Prof. Mason Thomas, Jacob Schramm, Delbert Funhouser. Photograph taken on rocks above second bridge beyond Forest Home. Courtesy: Cornell University, Plant Pathology Herbarium (CUP).

colleges; and [2] Whetzel soon requested that the new botany department be retitled as the Department of Plant Pathology, of which he would be the head. In Whetzel's (1945) own words: "In the spring of 1906, he [Bailey] disclosed to me his intention of establishing a department of botany and offered me the job of organizing it. The following autumn I was made assistant professor of botany and head of the department" [of Plant Pathology in the College of Agriculture].

This titular redundancy was, of course, awkward. Although somewhat confusing for a reader not familiar with the sub-sciences involved, the explanation may be opaque. According to Korf (1991): Whetzel's teaching of "most important parasitic fungi" (Botany II – mycology) had much earlier been offered by Atkinson and Durand in the Department of Botany [Liberal Arts], and by 1906-07 a course in Methods of Research in Plant Pathology was also offered in the [agriculture botany] department." Once the [agriculture] Department of Plant Pathology existed, "Two courses were offered in 1907-08, 1a — Plant Pathology and 2a — Methods of Plant Pathology, both taught by Whetzel and Donald Reddick, one of the 'Wabash boys' (see Fig. 5). By 1908-09 five courses, plus seminar and research, were offered by Whetzel, Reddick, and

another of the Wabash group, M.F. Barrus (Wabash class of '07)." Whetzel kept control of the introductory courses for the rest of his career, teaching them for the last time in 1943 (Korf 1991).

Back to Whetzel's testimony: "… In the summer of 1907 I decided to devote my effort entirely to the development of plant pathology as a field for teaching and research. I went to Dean Bailey with the request that my title be changed from assistant professor of botany to assistant professor of plant pathology and that I be relieved of responsibility for the work in other phases of botany. Apparently astonished at my temerity in suggesting an entirely new kind of chair in university faculties, he, nevertheless, consented to put my proposal before the Board of Trustees of Cornell University. When my appointment came through that autumn, it carried the title of assistant professor of plant pathology and head of the new department."

Sadly, in 1912, he was widowered, but later the same year he left for a 15-month-stay (1912–14) in Europe, with a residency at the University of Heidelberg working with Prof. Georg Klebs. Shortly after his return, two events burdened Whetzel's life. First, L.H. Bailey resigned the Deanship of Agriculture, thus removing a sympathetic ear in administration. With this change the future of the "New Botany" was put at risk.

According to Hesler (1975), an eye-witness: "In 1914, [Beverly Thomas] Galloway was induced to accept the deanship of the New York State College of Agriculture, at Cornell University. The move proved to be a disaster, both for him and for Cornell.

"Before coming to Cornell, although Galloway had had little or no academic administrative experience, he had been persuaded by Whetzel and others to accept the deanship there. It was unfortunate for him that he should follow at Cornell so skilled an administrator as Liberty Hyde Bailey. Galloway brought with him from Washington some of the Federal Bureaucracy practices in vogue there, and somehow these were both unfamiliar and unacceptable to the Cornell Agriculture faculty." He was also resistant to "New Botany" teaching philosophy. "Galloway's inaccessibility to the faculty, his ineptness in handling the legislature to get funds, and his general image all resulted in a few special faculty meetings (which [Hesler] attended) to discuss what the faculty felt was a grave problem. The net result of all this activity was pressure that was applied in such a way that in 1916, Dr. Galloway was led to resign. He then returned to the USDA where he pursued his work in plant pathology until retirement." For his part, during these same years Whetzel also served as 1915–18 President of the American Phytopathological Society.

In a second, then seemingly insignificant, event of 1914, the June assassination of Archduke Franz Ferdinand, heir to the Austro-Hungarian Empire sparked a diplomatic confrontation that quickly boiled over into World War I. Whetzel served energetically as Chairman of the American Phytopathological Society's War Emergency Board.

Now, in order to set the stage for the subsequent decade, some words must be added about Whetzel's personality. Bailey's choice of Whetzel as the person to translate the research of the experiment station into "normal language" testifies to Whetzel's affability and facility with language, and he was a persuasive evangelist. But as years passed with him at the helm of the department, some of his more energetic projects and idiosyncrasies began to chafe younger faculty who did not wish to subjugate themselves to authority. A few vignettes testify (enumerated for separation).

[1] Korf (1991): "One of the most unusual and to my mind most important features of Whetzel's course was that each student was held to complete 16 oral examinations, each on one week's work. These examinations were given both by laboratory instructors and by those professors in the department who might have worked with the disease studied that week. By virtue of Whetzel's commanding and demanding personality, almost every professor in the department took part in these oral examinations, usually lasting 20 to 30 minutes in that professor's office." The elapsed time for each examination was multiplied by the number of students enrolled in the course – time taken away from the professor's own teaching and research. Fitzpatrick (1945): "[Whetzel] applied an entirely new system of teaching perhaps on the English system, and belittled those who did not adopt it." Convinced of the value of his teaching style, Whetzel (1930) published on it.

[2] Whetzel considered the herbarium the backbone of the department (Korf 1991). He adopted a numerical system so that everyone could find a specimen and additions were placed at the end of the run. Individual herbaria and other specimens were frowned upon. The departmental herbarium was coordinated with slides, photos, notes, etc. under the same numbers. Although revealed as an efficient system, faculty discussion and approval were not sought. Fitzpatrick (1945): "…and though at times in his enthusiasm for organizing, he promulgated regulations approaching regimentation his motive in so doing were not selfish…"

[3] Korf (1991): Instead of each faculty sequestering his own instruments and reagents, Whetzel organized the first Plant Path stockroom—with check-out slips.

[4] Instead of each professor staging and executing his own photography, Whetzel placed one man in complete control of the department's photographic facilities and had him do all of its photography.

[5] Even technical terminology was not overlooked by Whetzel. Fitzpatrick (1945): "It must be conceded that in coining new terms, as in some other respects, he tended to be somewhat radical, and clearly took pleasure in nettling the ultraconservatives." Again, Whetzel (1929) was convinced that his terminology was salutary and published on it.

[6] Korf (1991): "The few [faculty] I did not meet in [these oral examinations] soon became acquaintances through the regular departmental afternoon coffee hour, attendance at which was 'expected' by Whetzel, whose sonorous, booming clarion call on a rising and then declining pitch, "Coffee, coffee," shook the whole building daily.

[7] Before his step-down from the headship, Whetzel (1918) published a major offering "An outline of the history of phytopathology," regarded by some as preemptory.

[8] Harry Fitzpatrick (Wabash '09), groomed by Thomas and molded by Whetzel, was by now on faculty in Plant Pathology at Cornell (hired specifically to teach mycology). Newhall (1980): "Fitz[patrick] hated cigar smoke and Whetzel smoked much of the time. He particularly liked to stand in Fitzpatrick's doorway and TALK AND PUFF and watch Fitz squirm. Fitz would later slam open the door and window and then go for a walk."

In 1922, Whetzel stepped aside as department head, succeeded by Louis Melville Massey (Wabash class of '12) who occupied the position until 1950.

The questions which surround the faculty discontent and Whetzel's retiring as department head to my knowledge are dealt with in only one paper (Jones 1922). Extended quotes from that short publication are warranted. Although the paper occupies only two journal pages, not all is germane to this narrative. The following quotes have been extracted.

"Professor H.H. Whetzel, who has been for fifteen years head of the Department of Plant Pathology of Cornell University College of Agriculture, retired on July 1 [1922] from the administrative leadership in order to devote his time and energies more fully to teaching and research together with the immediate preparation on one or more text books. Dr. L.M. Massey who has been acting head for the past year during Professor Whetzel's absence in Bermuda succeeds to the permanent position.

"When I last visited Cornell a year ago the Department had in addition to what were doubtless the largest undergraduate classes of any like department

in America, an enrollment of twenty-six graduate students. It has during the last thirteen years granted twenty-four Ph.D. degrees with major interest in plant pathology. … Whetzel has in his work, shown a genius for meeting old problems in a new way in the field of phytopathology.

"In a letter to his dean setting forth his reasons for wishing to retire from the headship, Whetzel says: 'I am convinced that with rare exceptions no man should be allowed to head a department for more than fifteen years. He should not serve for less than ten, unless he is a failure – then the sooner he steps out or is removed, the better. The head of a department who cannot in ten or fifteen years put over a big administrative project deserves no further time or opportunity.

"'… Few men can do both administration and teaching, let alone research also with full justice to all. After ten years of administrative work I long to give my time and energies fully to teaching and research work. As you know, I have for four or five years urged you to relieve me of the headship that I might devote myself wholly to my students and my investigations. I feel that another ten years would not only measure the span of my administrative usefulness but would also end any possibility of a successful return to teaching or research.

"'One of the most disastrous features of long tenure headship is its effect on ambitious and able young men in the staff. Such men see little hope of administrative opportunity within a reasonable period of time and either leave the institution for a better position elsewhere or become discouraged, discontented, often intriguing and disloyal to the chief. The result in the latter case is sure to be disastrous to someone, usually to the young man himself, often to the department and to the institution, not infrequently to the good name and prestige of the head of the department himself.'"

As to the question of whether Whetzel recognized the restive state of his faculty, the answer is affirmative, but he judged this as disloyalty to the head. Complaints were caused by lack of administrative opportunity as long as the head blocked upward mobility.

His reference to four or five years of request for relief from administration, given his style, success with "industrial fellowships" and numerous other innovations rings hollow. In fact, the request must have fallen on the deaf ears of the dean. Of course, Whetzel had a model in the brief term of Dean Galloway, who lasted only two academic years under duress.

It is difficult to splice "I am sure a younger man can carry it forward farther and with greater success than I could now." The word "now" could

refer to Whetzel's age or tenure in office, or it could refer to his wounded status in regard to faculty distaste for his headship. But the entire paragraph describes his role in the expansion and progress of the department. All told, the letter reads like that of a captain facing mutiny, but who cannot stand down without justification and self-praise. What a humbling situation to which to return from protracted research in Bermuda. Massey maintained the headship from 1921 to 1950 (29 years), somewhat longer than what Whetzel might have thought advisable.

If Whetzel's idiosyncrasies as department head were considered negative (and they were so by the increasing cadre of young faculty; Korf 1991), Whetzel's crowning achievement was establishment of "Industrial Fellowships." This program, while bringing increased funding, was controversial for perceived mixing of college, "pure" research with the commercial world's money. When plant pathology became an administrative unit in 1906, in Whetzel's (1945) own words: "I soon found out that the sum which the Dean [Bailey] was able to assign for the maintenance of the department was quite inadequate to meet the demands for the solution of plant disease problems of pressing importance in the State, and I began to cast about for other sources of funds for research." The first such fellowship started in 1909.

The "Industrial Fellowships" program took hubris on Whetzel's part. After ascertaining that a particular phytopathological problem could be ameliorated by research in his department, the potential commercial sponsor had to be contacted, informed of the benefits, and agree to a sum, all within Whetzel's comfort zone. Further persuasion was required: "It was early found that the cost to the department in supervision, equipment and administration of the work was approximately equal to the value of the fellowships themselves. Thus the State was compelled to provide increasing allotments to the Department of Plant Pathology to meet these requirements." "…we may conservatively say that well over half a million dollars have been made available to the department during the past 36 years." (written in 1945).

Pedagogically, the Industrial Fellowships turned laboratory-centered instruction on its head. In addition to bringing real organisms and real agricultural problems into the classroom for student consideration, they immersed the student in the "real world" laboratory to experience both the problem in question and the real economics of the crop and business of agriculture.

Whetzel (1945; Appendix 5) himself offered a detailed listing of the fellowships, their recipients and the money involved. He summed up the

program: "Of the 67 who have held one of these fellowships, 42 have received the doctorate degree at Cornell University and 2 elsewhere; 31 have become research professors or teachers in colleges or universities (9 at Cornell); 18 have become investigators (at professional stations) in the Federal service or in commercial organizations; 2 have turned to farming; and 6 are currently fellows in the department of plant pathology at Cornell."

Although the "Industrial Fellowship" program continued after Whetzel's retirement from the headship, they then required approval from above and were subject to "outside" accounting and lobbying for the state's contribution to the department's research. In the midst of such activity, in 1930, he again spent eight months in Europe.

According to institutional regulations, members of the faculty could not be awarded a degree by the same institution. Whetzel, therefore, could not receive a Ph.D. from the State College of Agriculture even though his research was far more than otherwise would have been acceptable. The years of serving on faculty, as department head and return to teaching and research were borne on a Bachelor of Science degree from Wabash College, class of 1902. In 1906, Wabash conferred on him an M.A. and later in his life, an honorary D.Sci. in 1931. A frequent field companion was Carlos Chardon, former Cornell student under Whetzel, Chancellor the University of Puerto Rico and later Commissioner of Agriculture and Labor. Honoring his field work and advocacy, the University awarded Whetzel an honorary D.Sci. in 1926.

Well before his retirement from the headship, Whetzel had become interested in plant pathogenic fungi whose sexual-state apparatus arose from sclerotial structures, especially members of the genus *Sclerotinia*. Now, upon relinquishing administrative duties, he had time to devote to this group and did so for the rest of his life. A score of publications appeared, and travel was undertaken to seek out the foreign species. Especially interesting was the variety of the asexual expressions, which often proved the only way to distinguish species of the group. His first publication on this subject dated from 1926 (Whetzel 1926), followed by 11 taxonomic contributions over the rest of his life. Fitzpatrick (1945): "Though Professor Whetzel in his earlier days had directed most of his investigations toward the solution of economically significant problems in plant pathology, his interests were always largely mycological, and his work on the *Sclerotiniaceae* during the last twenty-five years of his life was unquestionably his major accomplishment in research." It was Fitzpatrick who assembled Whetzel's posthumous last paper.

From his early days in the schools of Avilla, Whetzel was a collector of biological specimens. This curiosity never left him, and during his later years he participated in travel, now with a mature outlook and almost always with one or two companions. Venues included Puerto Rico in 1916, 1924, and 1931; a sabbatical 1921–22 in Bermuda and return in 1926; 1939 in Venezuela, all adding to the department herbarium – operating under the Whetzel numerical system.

Far from withdrawing from departmental activities, Whetzel soon was appointed a member of "The Committee of Three" (Whetzel, H.C. Coles, B.M. Duggar, a student of Atkinson and on faculty in the Liberal Arts Department of Botany) that organized the International Congress of Plant Sciences (a.k.a. Fourth International Botanical Congress) that met in Ithaca in August 1926. The Congress brought together mycologists and plant pathologists with botanists of all other fields. Whetzel was placed in charge of local arrangements, always a complicated task with little credit. In 1931, he attended the Fifth International Congress in Cambridge, England. Also in 1931, Whetzel was among the charter members of the Mycological Society of America, serving as its President in 1939, and the American Phytopathological Society in 1939. In the same year, Whetzel was widowered for the second time. Still, his teaching and research went on. Korf (1991) reported that Whetzel taught the Introductory Plant Pathology course for the last time in 1943. In 1944, Whetzel died and was buried in Ithaca, his personal and professional home for 44 years. Eulogies and memorials were many and sincere (Barrus & Stakman 1945).

Chapter 6. Wrapping it up.

This narrative deals with a sub-science within biology, namely botany, and two of its even narrower disciplines, mycology and plant pathology. Of these, every developing society must deal first with plant pathology—the failing of crops from unknown causes. Once it is established that such failures may be caused by parasitic organisms (i.e., by the application of Koch's Postulates), often taking decades, the door is opened for the study of the parasitic organisms themselves. This, in turn, invites study of similar but non-parasitic relatives—in the case of this narrative, the fungi, the science of which is mycology. The narrative opens soon after government (i.e., the Morrill Act of 1862) resolved to aid higher education in agriculture and mechanical arts, extends through the Hatch Act of 1887, granting support for state agricultural experiment stations, turns the century page, and terminates in the first half of the 20th. Using the

Fig. 6. Herbert Hice Whetzel, Joseph Charles Arthur, Harry Morton Fitzpatrick. On the steps of Bailey Hall, Cornell University. Courtesy Cornell Plant Pathology Department (CUP).

example of the four starring workers, a Malthusian explosion of research and teaching was in place well before World War II.

Farlow returned from Europe in 1874 chastened by the better botanical preparation of students than that of their American counterparts (Farlow 1876). Student Charles Bessey chafed when a microscope was locked away from botany students. J.C. Arthur wrote about pumpkin stems and exhibited a physiological apparatus at the St. Louis World's Fair. Herbert Whetzel constantly petitioned administration for more funds with which to equip classrooms with instrumentation. All these and more trace the growth of laboratory-centered instruction. Course popularity (and therefore enrollment figures) seemed directly related, and other sciences followed suit. As though by accretion the pedagogical movement morphed into the "New Botany." By the present day, the "New Botany" is an old proposition, largely dusty and overlooked, but the concept served, and continues to serve, as the basis for almost all college-level botanical (and therefore mycological and plant pathological) academics. Add to this the "Socratic" question and answer and the student becomes an investigator and the professor a consultant (Farlow 1913).

Almost all of the miniature biographies included here show men (sorrowfully, history does not document an equal role for women) who came from rural

backgrounds, typically from a farming lifestyle. Were the narrative to deal with the birth of accounting, the growth of classical music, the growth of the retail mercantile or progress in architecture, other societal roots might be revealed, but this is not so here.

Once the members in the narrative graduated from public schools, they often began a career in local school teaching. Wages were terrible, but there is a subtle point that after knowledge was personally absorbed, these young men had an internal urge to share their knowledge with a broader audience. When public school was insufficient, there came college, and after college, graduate studies. Ultimately, the urge to teach meant that the accumulated knowledge was again shared with others, namely (in this case) farmers and new generations of students. This urge to learn and to share knowledge predates the Common Era and will continue forward.

Although a strong strain of independence as part of the American society can be identified, there was an abiding attraction to European culture, not only for the arts and sophistication but also for the progress and breakthroughs emanating from the leading laboratories of the Continent. All four stars in the narrative not only participated, but repeatedly returned to Europe for study with leading scientific figures and consultations at herbaria, museums, and international meetings.

Essentially the same evolution can be written about ground transportation during the period in question. For example, Atkinson's appointment at Cornell combined the experiment station in Geneva and the campus in Ithaca, so it was necessary to travel back and forth. Horsepower was not merely a measurement of power but a mode of transportation. The distance between the two points was about 50 miles, easily a two-day trip, with livery stables, eateries, and lodging necessary. Railroad transportation between the campus and the station came late in the 19th century and was slow and sooty. The model T Ford was not readily available until after 1910, and roads were constantly ill-tended and tires questionable. Progress in plant pathology research depended to some extent on other societal progress apace.

Of the four stars in the narrative, three lived almost to an age normal for that era: Dudley to 70, Whetzel to 67, and Prentiss to 66. Only Thomas died prematurely at 46. These days (2020—pre-pandemic), all could have expected an additional 15–20 years, and Thomas 30.

Although Wabash College is featured here, the role of the small liberal arts college has remained clear, whether as a terminal degree or, here emphasized, preparation for graduate studies. During my own college years, we were

reminded of the value of connections with alumni, just as Mason Thomas made use of his Cornell years and his teacher George Atkinson and ex-student Herbert Whetzel for the benefit of his students. (see Fig. 6)

In 1880 (Anonymous 2020a), New York State established its Agricultural Experiment Station in advance of the 1887 Hatch Act and Michigan (1888) soon followed suit. They were not the first, but after 1887 and the Hatch Act, numerous other states took the federal scrip so within a decade several such stations existed, almost always part of land-grant universities. The growth and sophistication of research over the subsequent 140 years—including all mechanical/technological advances, from tractors, irrigation, fertilizers, drones, and reapers to soil science, computers and DNA sequence technology—have not only fed the nation but much of the world.

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Literature cited

Anonymous. 1896 (Sept.). Albert Nelson Prentiss. The Cornell Daily Sun, Vol. 17, No 2: 25.

Anonymous, 1912a. Mason Blanchard Thomas. Proc. Indiana Acad. Sc. 1911: 4-5.

Anonymous. 1912b. Mason Blanchard Thomas. Wabash College Record 10: 1-54.

Anonymous. 1913. Dudley Memorial Volume (with portrait). Leland Stanford Junior University Publications, University Series. 32 p. (with portrait) List of Cornell University pupils of Professor Dudley. + Dudley bibliography. http://trees.stanford.edu/PDF/DudleyMemorial.pdf

Anonymous. 2020a. Scientific investigation: A history of the New York State Agriculture Experiment Station. (retrieved June, 2020) https://genevahistoricalsociety.com/wp-content/uploads/2014/03/experiment-station-panels.pdf

Arthur JC. 1880. Stem of pumpkin for teaching. Bot. Gaz. 5: 33-35. https://doi.org/10.1086/325340

Arthur JC. 1885. Some botanical laboratories of the United States. Bot. Gaz. 10: 395-406. https://doi.org/10.1086/325866

Atkinson GF. 1896a. Albert Nelson Prentiss. Science 4(93): 523–524. https://doi.org/10.1126/science.4.93.523

Atkinson GF. 1896b. Albert Nelson Prentiss. Bot. Gaz. 21: 283–289. https://doi.org/10.1086/327352

Barrus MF. 1954. An account of the extension work conducted by the Department of Plant Pathology of the New York State College of Agriculture at Cornell University from its beginning until 1945. Plant Pathology Department, Cornell University. 402 p.

Barrus MF, Stakman EC. 1945. Herbert Hice Whetzel. Phytopathology 35: 659-670. [with photo portrait & list of publications]

Beal WJ. 1879. The New Botany: A lecture on the best method of teaching the science. In: EA Bessey. 1925. William James Beal. Bot. Gaz. 79: 103-106. https://doi.org/10.1086/333443

Beal WJ. 1908. The College in 1870. In: TC Blandell [ed.], Semi-centennial celebration of Michigan State Agricultural College: May twenty-sixth, twenty-ninth, thirtieth and thirty-first, nineteen hundred seven. East Lansing: The College.

Bessey CE. 1880a. Botany for high schools and colleges. New York: Henry Holt and Company. https://doi.org/10.5962/bhl.title.55136

Bessey CE. 1880b. A Sketch of the Progress of Botany in the United States in the Year 1879. Amer. Nat. 14: 862-870. https://doi.org/10.1086/272674

Bessey CE. 1881. Botany for high schools and colleges. 3rd rev. ed. New York: Henry Holt and Company. https://doi.org/10.5962/bhl.title.55136

Bessey CE. 1882. The *Asparagus* stem for laboratory study. Amer. Nat. 16: 43.

Bessey CE. 1884. The essentials of botany. New York: Henry Holt and Company. https://doi.org/10.5962/bhl.title.57027

Bessey CE. 1885. The younger school of botanists. Amer. Nat. 19: 73-74. https://doi.org/10.1086/274022

Bessey CE 1913 Some of the next steps in botanical science. Science, N.S. 37: 1-13.

Boothroyd CW. 1982. Charles Chupp: extension plant pathologist. Ann. Rev. Phytopath. 26: 41-47. https://doi.org/10.1146/annurev.py.20.090182.000353

Colman GP. 1963. Education & agriculture: a history of the New York State College of Agriculture at Cornell University. Ithaca, N.Y.: Cornell University. Accessed through eCommons@Cornell, http://hdl.handle.net/1813/10733

Cooke WB. 1956. The fungus collection of William Russel Dudley. Contributions from the Dudley Herbarium 5(1): 23-35.

Estey RH. 1994a. A history of mycology in Canada. Canad. J. Bot. 73: 751-766. https://doi.org/10.1139/b94-095

Estey RH. 1994b. Essays on the early history of plant pathology and mycology in Canada. McGill-Queen's University Press, Montreal. 383 pp.

Farlow WG. 1876. University instruction in botany. Amer. Nat. 10: 287-295.https://doi.org/10.1086/271652

Farlow WG. 1913. The change from the old to the new botany in the United States. Science 37: 79-86. https://doi.org/10.1126/science.37.942.79

Fitzpatrick HM. 1945. Herbert Hice Whetzel. Mycologia. 37 (4): 393-413. https://doi.org/10.1080/00275514.1945.12024001

Goodale GL. 1879. Guides for science teaching. II. Concerning a few common plants. Boston Society for Natural History.

Green JR. 1967 (reissue of 1909). A history of botany 1860-1900: being a continuation of Sachs "History of botany, 1530-1860." New York: Russell & Russell. https://doi.org/10.5962/bhl.title.28456

Hesler LR. 1975. Biographical sketches of deceased North American mycologists including a few European mycologists. MSS, unpaged. [Special Collections, library of the University of Tennessee, Knoxville

Jacobsen BJ, Burrows ME, Ong KL. 2008. Extension plant pathology: Bringing our science to the public, a century of progress. Online. APSnet Feature https://doi.org/10.1094/APSnetFeature-2008-0508

Jones LR. 1922. Whetzel resigns headship - deplores present system of administrative tenure. Phytopathology 28: 257-269.

Kent GC 1979 Important little-known contributors to plant pathology: Mason Blanchard Thomas. Ann. Rev. Phytopathology 17: 21-28.

Korf, RP. 1991. An historical perspective: Mycology in the departments of Botany and Plant Pathology at Cornell University and the Geneva Agricultural Experiment Station. Mycotaxon 40: 107-128.

Lloyd CG. 1920. Joseph Charles Arthur. Mycological Notes (No. 62). Cincinnati, Ohio. p. 904.Mllis, WA 1912 Memorial Issue. Wabash College Record 10: 49.

Newhall AG. 1980. Herbert Hice Whetzel: Pioneer American plant pathologist. Ann. Rev. Phytopath. 18: 27-36. https://doi.org/10.1146/annurev.py.18.090180.000331

Olive EW. 1902. A monograph of the Acrasiae. Proc. Boston Soc. Nat. Hist. 30(6) 451-513.Pegg EC, Thomas NS. 1909. The woodlot for central Indiana. Proc. Indiana Acad. Sci.25: 1-21.

Petersen RH. 1979. Lexemuel Ray Hesler. February 20, 1888 - November 20, 1977.Mycologia 70: 757-765.https://doi.org/10.1080/00275514.1978.12020281

Petersen RH. 2019. North American mycology comes of age: the 19th century participants and their roles. Mycotaxon 134: 1-110. https://doi.org/10.5248/134.1

Pfister DN 2010 Asa Gray and the Harvard summer school. Harvard Papers in Botany 15(2): 305-308.

Pool RJ. 1934–35. The evolution and differentiation of laboratory teaching in the botanical sciences. Iowa State Col. J. Sci. IX: 235-242.

Reddick D. 1919. Vern Bonham Stewart. Phytopathology 9(3): 111-113.

Rochow WF, Tyler LJ, Miller RL. 1983. Walter Hagemeyer Burkholder. http://ecommons.ibrary.cornell.edu/handle/1813/17813

Rudolph F. 1977. Curriculum: a history of the American undergraduate course of study since 1636. San Francisco: Jossey-Bass.

Stewart VB. 1913. The fire blight disease in nursery stock. New York Cornell Agr. Exp. Stat. Bull. 329: 316-372. https://doi.org/10.5962/bhl.title.36996

Sundberg MD. 2011. Botanical education in the 1880s and 90s. Part 1, The impact of Linnaeus and the foundations of modern pedagogy. Pl. Sci. Bull. 57(4):134-158.

Sundberg MD. 2012 Botanical education in the 1880s and 90s. Part 2: The nineteenth century botany for the masses vs. professionalization of botany. Pl. Sci. Bull. 58(3): 104-131.

Sundberg MD. 2014 Botanical education in the 1880s and 90s. Part 3, The Botanical Society builds the discipline, 1895-1960. Pl. Sci. Bull. 60(1): 28-61.

Thomas CC. 1924. The Chinese Jujube. USDA Department Bull. 1215. 48 p. https://doi.org/10.5962/bhl.title.109053

Thomas MB, Dudley WR. 1894. A laboratory manual of plant histology. Crawfordsville, IN. x + 115 + 15 pls.

Whetzel HH. 1918. An outline of the history of phytopathology. W.B. Saunders. Philadelphia, London. https://doi.org/10.5962/bhl.title.55666

Whetzel HH. 1926. North American species of *Sclerotinia*. Mycologia 18: 224-235. https://doi.org/10.1080/00275514.1926.12020514

Whetzel HH. 1929. The terminology of phytopathology. Proc. International Congress Plant Science. 2: 1204-1215. Whetzel HH. 1930. An experiment in teaching. Scientific Monthly 31: 151-162.

Whetzel, H.H. 1930 An experiment in teaching. Scientific Monthly 31: 151-162.

Whetzel HH. 1945. The history of industrial fellowships in the Department of Plant Pathology at Cornell University. Agricultural History 19(2): 99-104. https://pppmb.cals.cornell.edu/about-us/history/ [Plant Pathology and Plant-microbe Biology Section, School of Integrative Plant Science. On-line] https://www.wabash.edu/aboutwabash/history [History of Wabash College]

Appendix 1.

Notable Prentiss students at Michigan State

Charles Edwin Bessey (1845–1915). Born: Milton, Wayne County, Ohio. Michigan State College 1866, B.S. 1869. Intended to be a civil engineer. 1869 Professor of Natural History, Iowa State College (Ames). Met Asa Gray at AAAS meeting, went to Harvard – no Ph.D.? 1886, left Iowa State; Chair of Botany at University of Nebraska. 1891 taught a course with laboratory at University of Minnesota.

Byron David Halsted (1852–1918) Born: Venice, NY. Michigan State B.S. 1871, M.S. 1874. 1885–89 Professor of Botany, Iowa State College. 1889 until death, Professor of Botany, Rutgers College & New Jersey Agricultural Experiment Station.

Samuel Mills Tracy (1847–1920) [data missing from Hesler 1975] Born: Hartford, Vermont. Union Army. Michigan State Agricultural College: B.A. 1868, M.A. 1871. 1871–77 Horticulture at Michigan State University. 1877 Professor of Botany, University of Missouri. 1887–88 collaborated with B.T. Galloway who eventually served briefly as Dean of Agriculture at Cornell. 1888–97, Director of the Mississippi Agricultural Experiment Station, Starkville.

William Powell Wilson (1844–1927), Born: Oxford, Oakland Co., Michigan. Orphaned when very young, lived and worked on a farm. Entered the State Agricultural College of Michigan in 1864. In 1873, became assistant to Dr. Goodale at Harvard, recommended by Asa Gray; B.Sci. 1878, Lawrence Scientific School. Graduate studies in Europe, 1878–80. Awarded D.Sci., from Tübingen University (Germany). Upon return settled in Philadelphia as Professor of Botany, University of Pennsylvania. At the Columbian Exposition in Chicago, 1893, conceived of economic or commercial museum for Philadelphia; museum established and Wilson became an international diplomat.

Appendix 2.

Notable Prentiss students at Cornell University
(Annotated from Atkinson 1896b)

Joseph Charles Arthur (1850–1942). Cornell Experiment Station; Professor of Vegetable Physiology at Purdue University.

Frederick Vernon Coville (1867–1937). Chief of the Division of Botany of the U.S. Department of Agriculture.

William Russel Dudley (1849–111). Professor of Botany in the Leland Stanford Jr., University.

Romeyn B. Hough (1857–1924). author of the classic 17-volume American Woods.

Joseph Austin Holmes (1859–1915). Professor of Botany and Geology at University of North Carolina; later State Geologist.

William Ashbrook Kellerman (1850–1908). Cornell B.S. 1874, Professor and Department Head of Botany at Ohio State University.

William R. Lazenby (1850–1916). Professor of Botany then Professor of Horticulture at Ohio State University. When the biology department was split, Lazenby became Department Head alongside Kellerman.

Clarence Wentworth Matthews (1877–1928). Professor of Horticulture and Botany at State College of Kentucky; First Dean, College of Agriculture; National Bureau of Education during WW I.

Veranus Alva Moore (1859–1931). A bacteriologist at the Bureau of Animal Industry of the U.S. Department of Agriculture; Professor of Comparative Pathology, Cornell University; Dean of the Veterinary College, Cornell.

Appendix 3.

Notable Dudley students at Cornell University

Annotated from Anonymous (1913);
* = Also listed by Korf (1991)

*Arthur, Joseph Charles; B.S., M.S., Ph.D.
Professor of Vegetable Physiology and Pathology,
Purdue University, Lafayette, Indiana

*Atkinson, George Francis; B.Phil.
Professor of Botany, Cornell University, Ithaca, New York

Brady, William L.; A.B., A.M., Ph.D.
Professor of Botany, Syracuse University, Syracuse, New York

Chester, Frederick Dixon; B.S., M.S. Bacteriologist;
Director, State Bacteriological Laboratory of Delaware

Corbett, Lee Cleveland; B.S., M.S. Horticulturalist,
Department of Agriculture, Washington, D.C.

Coville, Frederick Vernon; A.B. Botanist,
Department of Agriculture, Washington; Head of the National Herbarium.

Craig, Moses; M.S.; Missouri Botanical Garden, St. Louis.

Densmore, Hiram Delos; A.B., A.M. Professor of Botany, Beloit College.

Durand, Elias Judah; A.B., D.Sci. Professor of Botany,
University of Missouri, Columbia, Missouri.

Gregory, Emily Lorina; A.B. Professor of Botany,
Barnard College, Columbia University, New York.

Henderson, Louis Fournquist; Ph.D. (Formerly) Professor of Botany,
University of Idaho, Moscow.

Hicks, Henry; B.S. Nurseryman, Westbury, Long Island. New York.

Hoffman, Harry Natt; B.Agr. Nurseryman, Elmira, New York.

Hough, Romeyn Beck, A.B. Professor of Forestry, Yale University.

Howell, Jenny Kirk; Ph.D., M.S. Teacher, Plainfield, New Jersey.

*Kellerman, William Ashbrook, B.S., Ph.D. Professor of Botany,
Ohio State University, Columbus.

Lazenby, William Rane; B.Agr., M.Agr. Professor of Forestry,
Ohio State University, Columbus.

Moore, Veranus Alva; B.S., M.D. Director,
New York State Veterinary College, Cornell.

Norris, Harry Waldo; A.B., A.M. Professor of Zoology, Grinnell College

Porter, Edna. Botanical Gardens, Buffalo, New York.

Rowlee, Willard Winfield; B.L., Sci.D. Professor of Botany, Cornell University.

Schrenk, Herrman von; B.S., A.M., Ph.D. Consulting Timber Engineer, Plant Pathologist, St. Louis, Missouri.

Smith, Theobald; Ph.D., M.D., A.M., Ll.D. Professor of Comparative Pathology, Harvard Medical School, Boston.

Snow, Julia Warner; B.S., M.S., Ph.D. Professor of Botany, Smith College, Northhampton, Massachusetts.

*Thomas, Mason Blanchard; B.S. Professor of Botany, Wabash College.

*Trelease, William; B.S., Sc.D., LL.D. Director, Missouri Botanical Garden, St. Louis, Missouri.

White, Charles David; B.S. Geologist, Geological Survey, Washington, D.C.

Yatabe, Ryokichi; B.S. (Late) Professor of Botany, Imperial University, Tokyo, Japan.

> The Dudley Memorial Volume (Anonymous 1913) also includes a list of Dudley's notable Stanford University students, a list easily twice as long as his Cornell students.

Appendix 4.

Thomas-mentored students to graduate studies

(Annotated from Kent 1979) In order of graduating class

Olive, Edgar William (1870–1972) '93

Edgar William Olive was the first botany student mentored by Mason Thomas at Wabash (class of 1893). Born in Lebanon, Indiana, Olive taught school in Boone County in order to pay for attendance at Wabash. After his A.B., he remained, becoming an assistant to Thomas and receiving an A.M. in 1895. Thereafter, he studied in the Cryptogamic Laboratory at Harvard University, earning an A.M. in 1897 and a Ph.D. in 1904. His thesis was "A monograph of the *Acrasiae*" (Olive 1902). An appointment at the University of Wisconsin was followed by a similar job at South Dakota State College. In 1916, Olive was appointed as Head of the Botanic Gardens at the Brooklyn (NY) Institute. A "second life" began in 1920 when he joined his brother in the family accounting firm in Indianapolis, Indiana. At the age of 80, he moved to Florida to join an investment and real estate project. Celebrated as the oldest Wabash alumnus at age 100, Olive died in Indiana.

Moore, George Thomas (1871–1958) '94.

George Thomas Moore was born in Indianapolis, Indiana. With Olive and Miller, he was among the earliest botanical students of Thomas at Wabash. In addition to Wabash (A.B., class of 1894), Moore received a B.A., M.A., and Ph.D. from Harvard and became Director of the Missouri Botanical Garden (from 1912–53; founded in 1914) and Engelmann Professor in the Henry Shaw School of Botany of Washington University. During 1909–19, he was Head of Botany at the Marine Biological Lab at Woods Hole, M.A. There he joined Jake Schramm, also a Wabash grad, and during summers, Mason Thomas from Wabash and Thomas's student, Lex Hesler.

Miller, Robert Barcley (1875–post 1948), '96

Together with George Moore and Edgar Olive, Robert Barcley ("Dusty") Miller—born in Lincoln, Nebraska but educated in Thornetown, Indiana—was an early Thomas student at Wabash (class of 1896). Armed with the A.B. degree, Miller was Assistant Principal of Thornetown High School in 1897-1898, becoming Professor of Natural Science at Rochester Normal School in 1899. There followed appointments at Dakota Wesleyan College and Huron College, both in South Dakota. He received an honorary M.A., also from Wabash, in 1906. Later that year, Miller enrolled in graduate studies at Yale's Sheffield Scientific School and was granted a Ph.D. in 1908. In 1909, he gained the position as Dean of Forestry, University of New Brunswick, Canada, but in 1914, became one of the earliest workers with the Illinois Natural History Survey. By 1929, Miller was listed as Chief Forester, Illinois Department of Agriculture.

Hoobler, B. Raymond (1872–1943) '01

B. Raymond Hoobler stayed for a Master's Degree in 1902 before attending Cornell Medical School (M.D. 1905). Only 11 years out of Wabash, he was at Thomas's bedside

during Thomas's last days. Serving at several leading hospitals, Hoobler became Chief of Medicine at Children's Hospital and Professor of Pediatrics at Wayne State University, Detroit, Michigan.

Whetzel, Herbert Hice (1877–1944) '02

Born in Avilla, in the upper east corner of Indiana, Herbert Hice Whetzel became a formidable, albeit controversial, force in plant pathology. In Avilla's secondary schools, he was several years ahead of Harry Fitzpatrick (q.v.) whose future Whetzel greatly influenced. As a student at Wabash, Whetzel lived with Professor Thomas's family and so had ample time to absorb the Thomas magic. Using contacts from his student days at Cornell, Thomas arranged for Whetzel to become a summer assistant to G.F. Atkinson at Cornell, and that summer Whetzel, Atkinson and Atkinson's student, Calvin H. Kauffman collected fungi together. Once the Cornell attachment was made, it was never broken and Whetzel served as Professor in Atkinson's Botany Department and eventually as Head of the new Plant Pathology Department until 1922. The events of this time period deserve a more detailed description (see the narrative), but one of Whetzel's innovations was establishment of "Industrial Fellowships" through which the agriculture industry supported phytopathological research to the benefit of the industry, to Cornell and to the supported students, including subsequent Thomas students from Wabash.

Germane to the outline of Whetzel's role in Cornell (and national) plant pathology, Whetzel was hired at Cornell by Liberty Hyde Bailey, the idealist humanist sociologist of rural living and Dean of the newly established New York School of Agriculture at Cornell University. Bailey was a bit of a "radical missionary," essentially devoting his life to the distribution of technical education to the masses of farm-oriented professions. His evangelism was replaced when new mechanization of disease control, soil improvement, and other aspects of farming resulted in over-production of crops. Family farms could prosper under these new and changing technologies. In 1913, Bailey resigned his position as Dean of the College of Agriculture and devoted the rest of his life to research, largely a taxonomic study of palms. It could be surmised that Bailey and Whetzel supported each other philosophically and enthusiastically.

Record, Samuel James (1881–1945) '03

A local boy from Crawfordsville, Indiana, Samuel James Record attended Wabash College, obtaining a B.A. (1903), M.A. (1906), and honorary D.Sci. (1930). A bit of a pioneer, Samuel was one of the first Thomas protégés to enroll at Yale School of Forestry, earning a Master's degree in 1905. After a stint with the U.S. Forest Service in Arkansas and Ozark National Forests, Record returned to Yale. In 1912, he published the first of his significant books, Economic woods of the United States, followed by Mechanical properties of wood in 1914. Both books went through second editions and became standards in the fields, with scanned versions available even now in 2020. A career of field trips over the world produced a large collection of wood samples and an encyclopedic knowledge of timber woods. By 1917, Record was a full Professor of Forestry, and in the 1920s founded both the International Society of Wood Anatomists

and the journal Tropical Woods. In 1945, he was placed in charge of tropical forestry and in 1939 was appointed Dean of the School of Forestry. Record was associated with Yale until his death.

Funkhouser, William Delbert (1881–1948) '05

William Delbert Funkhouser became a well-respected zoologist and anthropologist. Born in Rockport, Indiana, he graduated high school in Indianapolis before entering Wabash College. Although known as a practical jokester, he was a member of Phi Beta Kappa and graduated with honors. After three years teaching in high schools, he entered Cornell's Zoology Department, earning an M.A. (1912) and Ph.D. (1916; dissertation: Biology of the *Membracidae* of the Cayuga Lake Basin). During these years he also taught in Ithaca High School. An extra year was spent at Cornell as an "Honor Fellow," but in 1918, Funkhouser was appointed as Head of the Department of Zoology and Entomology at the University of Kentucky in Lexington. Several long-distance field trips, correspondence with appropriate authorities, and receipt of worldwide specimens of tree hoppers established Funkhouser's career, but opportunities were soon presented that quickly evolved into a parallel career in archeology, especially of Ancient Man in Kentucky. In 1925, Funkhouser was elevated to Dean of the Graduate School, a job which cut into his research time. In 1942 he served as president of the Entomological Society of America. He remained as Dean until shortly before his death of lung cancer in 1948.

Reddick, J. Donald (1883–1955) '05

In spite of being born in Missouri, J. Donald Reddick graduated from Wabash College in Indiana. He entered Cornell before the separation of the College of Liberal Arts and the New York State College of Agriculture. This distinction was to play a key role in Reddick's career. In the botany department he was an Assistant to Dr. George F. Atkinson who served as his major professor for the Ph.D. degree in 1909. In 1907, however, he was appointed the first Instructor in the new Department of Plant Pathology. According to Korf (1991): "[Reddick's] early duties at Cornell included the teaching of formal undergraduate courses in principles of plant disease control and the instruction of graduate students in the field of mycology and in methods in the study of plant diseases." In this way, Reddick reported to both Atkinson and Whetzel, but Whetzel retained Reddick in the new Plant Pathology faculty.

Reddick became well-known for his investigation into potato diseases. More particularly, recent research had indicated that the cultivated potato had its origins in Mexico, so Reddick travelled there to retrieve "primitive" stocks leading to hybridization experiments and resistance to common diseases. In those years Reddick also served as Editor of Phytopathology (1915–18), President of the American Phytopathological Society (1920), and Secretary of the Plant Pathology Section of the International Botanical Congress at Ithaca (1929).

Although tangential to this narrative, during 1918–21 the Plant Pathology faculty grew impatient with Whetzel's administrative style, festering a schism until 1922, when Whetzel stepped away from the headship (to be succeeded by Massey). It was

Korf's (1991) opinion: "Then there was Donald Reddick, a potato breeder, and internationally known pathologist and the purported ringleader of the revolt against Whetzel's chairmanship that rocked the department in the early 20's." Through it all, Reddick remained in place, rising from Assistant Professor to Associate Professor to Full Professor until his retirement in December 1950, five years before his death in Gainesville, Florida.

Stewart, S.S. '06

I can find no record of "S.S. Stewart '06" other than the listing by Kent (1979).

Ruth, Warren Albert (1884–19xx) '06

Another Hoosier, Warren Albert Ruth was born in Mishawaka, Indiana, in the very north of the state. His fellow graduate was another Prof. Thomas student, class of 1906, S.S. Stewart. After obtaining an M.A. in pomology from Wabash in 1909, Ruth was hired by the University of Illinois Agricultural Experiment Station (Urbana) where he received his Ph.D. in 1919 from the University. His fate through WW I is not known, but Ruth stayed on the staff of the Illinois Station and also became an Assistant Professor in Agriculture at the University. His later years could not be ascertained.

Barrus, Mortimer Franklin (1879–1962) '07

Born in Forestville, Chautauqua Co., NY, Mortimer (a.k.a. Mortier) Franklin Barrus was listed in the U.S. Census as still living with his mother at 21 years old. An older-than-usual graduate of Wabash in 1907, Barrus came to Cornell just when the Plant Pathology Department was established and before the time of "Industrial Fellowships." He obtained a Ph.D. degree in Plant Pathology, and remained at Wabash for the rest of his career as Professor of Plant Pathology and as Extension Professor of Plant Pathology, specializing in field crop diseases from beans to potatoes (Barrus 1954). Publications continued into the 1940s and 50s. In a historical summary of extension plant pathology (Jacobsen & al 2008): "The first officially appointed extension plant pathologists were R.E. Vaughan at Wisconsin and M.F. Barrus at Cornell in 1915. However, it should be pointed out that Dr. Barrus had already been appointed Assistant Professor of extension work on September 20, 1911 at the New York State College of Agriculture." Perhaps Barrus's most noticed publication was The Potato with fellow Cornellian, AW Gilbert in Plant Breeding, published by McGraw Hill as part of a pioneering series of such books. Korf's (1991) comment: "M.F. Barrus, a gentle, delightful man, had worked with diseases of beans, potato, and fruit." Barrus was an early President of the American Phytopathological Society in 1928.

Anderson, Harry Warren (1885–1971) '07.

Harry Warren Anderson was born in Ladoga, Indiana and buried in Crawfordsville. His brother, Paul, followed at Wabash, class of 1910. Harry remained at Wabash as an instructor from 1908–10, and after a brief sojourn at the University of Illinois, returned to Wabash as Rose Professor and Head of the Department of Botany, succeeding his mentor, Mason Thomas. In 1916, he returned to the University of Illinois and was Associate Professor of Pomology and later Professor of Plant Pathology. As late as 1956,

Harry Anderson published Diseases of fruit crops through McGraw Hill. Harry's son, Phillip W. Anderson, won the Nobel Prize in Physics in 1977.

Dorner, Herman Bernard (1878-1955) ex '08

Herman Bernard Dorner was born in Lafayette, Indiana, of parents who were prominent carnation breeders and ran a greenhouse. Unlike the others in this roster, Dorner earned his B.S. at Purdue University in 1900, and an M.S. in 1901. In 1905 he was a Botany Assistant at Purdue and an Assistant at Indiana State College, but in 1906–07 he became Assistant Professor of Botany at Wabash. In 1907, he co-authored A key to the genera of native forest trees and shrubs of Indiana. Author of several popular articles on flower growing (especially carnm 9-lo[p0ations), he was a founder of "Flowers by Wire," the florists' telegraph delivery. By 1911, Dorner was an Associate Professor in Floriculture at the University of Illinois and its Agricultural Experiment Station. Dorner retired in 1946 as Professor of Floriculture at Illinois.

Price, Earl '09

Unfortunately, essential data on Earl Price (Wabash 1909) are missing. Conflicting sources report: [1] 1915. Earl Price, Harrisburg, Illinois, county agent. [2] 1916 Earl Price, school teacher of agriculture in Valparaiso, Indiana. [3] 1964. "Dean" [of Agriculture] Earl Price of Oregon State, witness at House ([of US Representatives] Committee on Appropriations. Perhaps the first report is correct

Stewart, Vern Bonham (1888–1918) '09

Vern Bonham Stewart was another Hoosier born in Avilla, Indiana (see also Whetzel, Weimer). After graduation from Wabash he spent the summer supported by an "Industrial Fellowship" sponsored by the C.W. Stuart [nursery] Co. of Orleans, NY, after which he entered Cornell Plant Pathology, already with the title of Fellow. His Ph.D. was earned in 1913, and he joined the staff at the Cornell Agricultural Experiment Station. His thesis (and publication; Stewart 1913) was on the fire blight disease of nursery stock. He remained a frequent author of plant pathology papers and remained on the staff through June 1918. He accepted an appointment at the "Bureau of Plant Pathology" in Washington. In December 1918, in Newark, NJ, he died of pneumonia (probably a complication of the "Spanish flu"), leaving a wife and infant daughter (Reddick 1919).

Pegg, Ernest Cecil (1888–19xx) '09

Essential data are also missing for Ernest Cecil Pegg (Wabash 1909), winner of that year's Eastman Prize. Born in 1888 in Fountain City, Indiana, Pegg was interested in forestry as an undergraduate. In his senior year, Pegg and fellow student N.S. Thomas (Pegg & Thomas 1909) published in the Proceedings of the Indiana Academy of Science. Upon graduation he spent three months "timber estimating" in Tennessee before attending Yale Forestry School, graduating in 1911. After a year with the U.S. Forest Service at Jemez National Forest in New Mexico, he joined the one-man faculty at the University of Missouri Forestry School. He was immediately put in charge of establishing the "summer camp" in forestry. In 1919 he resigned his Missouri post, and the Department of Forestry was abolished a year later. At this point the trail peters out.

In 1912, Pegg was married in Crawfordsville, Indiana, to Ruth Amanda Hesler, daughter of Benton F. Hesler. Considering that Lex Hesler's tenure at Wabash ended in 1911, the match may not have been coincidental.

Fitzpatrick, Harry Morton (1886–1949) ex '09

Born in Greenwood, Indiana, Harry Morton Fitzpatrick attended high school in Crawfordsville where he became acquainted with Herbert Whetzel, then a student at Wabash. Fitzpatrick entered Wabash College, 1905, where Mason Thomas was his mentor. Aided by Thomas and Whetzel (by that time a graduate student at Cornell), Fitzpatrick transferred to Cornell in 1908 to become an assistant to George Atkinson (in Botany). He received his A.B. from Cornell in 1909 and continued on to graduate school as Assistant in Plant Pathology and later as Instructor. His Ph.D. was awarded by Cornell in 1913. By then Whetzel was Head of the new Plant Pathology Department and Fitzpatrick was immediately appointed Assistant Professor, with duties to teach mycology, which developed into a full-year course. Lex Hesler knew Fitzpatrick well, for they overlapped for some years at Cornell. Of Fitzpatrick, Hesler (1975) wrote: "Two characteristics of the man stood out in my memory: he was an unusual scholar and teacher; and he was a recluse."

According to Hesler: "Fitzpatrick was highly respected by other mycologists, but only a few knew him well. He was quiet, and often seemed dubious of the sincerity of some individuals. Through poor health and brooding over the suicide of a favorite son, Fitzpatrick himself took his own life in December 1949." Korf (1991) included reminiscences of Fitzpatrick (aka "Prof. Fitz"), who was Korf's major professor: "He was often considered morose, but in fact had a deep sense of humor, though he could often be put off. He was said to have been champion at pitching pennies in the hallways, a departmental pastime in which he is reputed to have relieved many a graduate student of his (her) horde of pennies." Also reputed to be competent on the tennis court, Fitzpatrick shared his energy in service appointments; he was one of the founders of the Mycological Society of America (1931) and its President in 1936. He was also its Historian and wrote of its early times (Fitzpatrick 1924).

Korf (1991): "On founding the Plant Pathology department Whetzel understandably sent all the plant pathology students down to the Arts College to take their mycology from Atkinson, but Atkinson's greater and greater preoccupation with the agarics led to a somewhat distorted course offering. When Harry M. Fitzpatrick, who while at Wabash had been thoroughly indoctrinated and encouraged by Whetzel, completed his doctorate under Atkinson in 1912, Whetzel installed him in the Plant Pathology department to teach mycology."

As mentioned by Petersen (2019) and others (e.g., Hesler 1975), there was bad blood between G.F. Atkinson and Curtis Gates Lloyd. In 1920, Lloyd came to Ithaca to visit his nephew, but Atkinson shunned him. As told by Korf (1991): "Fitzpatrick heard that Lloyd was in town, contacted him, and invited Lloyd to lecture to his students and accompany them on a number of field trips in the area. Fitzpatrick's kindnesses, and for Lloyd perhaps unexpected 'acceptance' in academia, led Lloyd to purchase, unbeknownst to anyone in the Department, three major collecting grounds, which he

then gave to the University. These are now called the Lloyd-Cornell Preserves…to this day some of the best areas in which to collect fungi within a 50 km radius of Ithaca."

Taylor, Clarence Egbert (1886–1971) '10

Clarence Egbert Taylor was born in Anthony, Kansas, but the family moved to South Bend, Indiana, when Taylor was still very young. After graduation from South Bend High School, Clarence entered Wabash College and subsequently Yale School of Forestry, receiving a Master's Degree in 1912. That August, Taylor was in the U.S. Forest Service at Plumas National Forest, northeastern California, headquartered in Quincy. That forest included Mt. Shasta and the northern terminus of the Sierra chain. In 1913 he was loaned to the Pennsylvania Chestnut Blight Commission, but soon was transferred to Pine Mountain National Forest in west-central Georgia (established 1906). By 1921–22, Taylor was listed as "forest examiner" at Cochetopah National Forest, Colorado. All three of these national forests were established during the presidency of Theodore Roosevelt as part of his conservation program. Further data on Taylor are missing.

Anderson, Paul Johnson (1884–1971) '10

A product of Lodoga, Indiana, Paul Johnson Anderson (Wabash 1910), younger brother to Harry Anderson (q.v.) was appointed to one of Whetzel's "Industrial Fellowships" for 1910–11 and was awarded a Ph.D. by Cornell University Plant Pathology in 1913. His thesis was The morphology and life history of the chestnut blight fungus. His early career was at the Massachusetts Agricultural Experiment station (of Massachusetts Agricultural College) but by 1926 he was on staff at the Connecticut Agricultural Experiment Station, headquartered in new Haven. He became Pathologist in Charge, Connecticut Tobacco Experiment Station (at Windsor, CT) where he stayed until retirement to Florida. Perhaps tellingly, Anderson is buried in Amherst, Massachusetts.

Davis, Elmer E. (dates unknown)'10

Elmer E. Davis spent much of his career at the American Type Culture Collection and was publishing on fungi as late as 1976.

Rankin, William Howard (1888–19xx) '10

William Howard Rankin proceeded to Cornell Plant Pathology for a Ph.D. in 1912. By 1912 he was publishing on chestnut canker disease and in 1918 wrote A Manual of Tree Diseases, the second book in a series on tree pathology from MacMillan Co. In the preface, Rankin thanked several Cornell colleagues among whom were other Wabash graduates. The book was popular enough to see a second printing in 1923. In 1920, in a popular Cornell journal there appeared the following: "Dr. William H. Rankin, for the last five years assistant professor of plant pathology, has been appointed officer in charge of the field Laboratory of Plant Pathology of the Canadian Department of Agriculture, with headquarters at St. Catherine, Ontario, and has entered upon his duties." Two histories of Canadian plant pathology and mycology (Estey 1994a,b) cite Rankin as one of a few forest pathologists dealing with Canadian fir. By 1925, Rankin was back at Cornell, but this time at the Geneva Experiment Station. That year, Rankin collaborated

with other Cornell colleagues on a second edition of Laboratory outlines in plant pathology ("Second edition, completely revised and rewritten"). In 1933, Rankin was second author on a paper on raspberry growing in New York State.

Rees, H.L. (dates unknown) '10

H.L. Rees was one of several Thomas students in Thomas's later time at Wabash. Oddly, Rees was reported at Cornell University Plant Pathology in 1910, where he replaced C.N. Jenson as an assistant, but later in 1910 he was Plant Pathologist at the Oregon State College Agricultural Experiment Station, Corvallis, where he wrote the annual report for the Department of Plant Pathology. A note in Mycologia in 1913: "Mr. H.L. Rees has moved to the Western Washington Experiment Station, Puyallup." There he published 11 papers in seven years (1913–20) but at that point his biographic material runs out. Much essential information is missing.

Schramm, Jacob Richard (1885–1976) '10

A Hoosier from Hancock Co., Indiana, Jacob ("Jake") Richard Schramm not only graduated from Wabash but continued his interaction with Thomas and other Wabash academics for years. Schramm's botanical career started at Washington University (St. Louis) where he earned a Ph.D. in 1913. For a decade, he taught at Cornell in the Botany Department (not Plant Pathology). As an independent investigator during these years Schramm spent summers at the Marine Biology Station at Woods Hole, Massachusetts, where Mason Thomas and G.T. Moore also worked. Thomas brought later students with him, always on some sort of grant arranged by Schramm (or Herbert Whetzel; q.v.), among whom was Lex Hesler. G.T. Moore moved to St. Louis to become Professor of Botany at George Washington University. Moore was so impressed by Schramm that he had him appointed as a 3-year Lackland Fellow at George Washington, and when Moore took directorship of the Missouri Botanical Garden, Schramm became his chief assistant. His later address was St. Louis Botanical Garden and Washington University (St. Louis), but for the rest of his career he was Professor of Botany at the University of Pennsylvania (1937–55) and also Director of the Morris Arboretum (1939–54). He was one of the founders of Botanical Abstracts and served with G.T. Moore on its Editorial Board. In retirement, Schramm was a Research Scholar at the University of Indiana.

Hesler, Lexemuel Ray (1888–1979) '11

Of the considerable roster of Wabash graduates covered here, Lexemuel ("Lex") Ray Hesler is the only worker for whom too much information is presently available. Born in Veedersburg, Indiana, in 1907 the Hesler family moved to Crawfordsville, Indiana, coincident with Lex's entrance into Wabash. Among his new college friends were Jacob Schramm (q.v.) and Harry and Paul Anderson (q.v.) all destined for graduate work proposed by Mason Thomas, their mentor. Even before graduation from Wabash, Hesler worked on one of Whetzel's "Industrial Fellowships," this one from apple growers in New York State. The fellowship was to be extended through his graduate school career. Upon receipt of his Cornell Ph.D. in 1914, Hesler was retained on the faculty until 1919, when he moved to the University of Tennessee as Professor of Botany and Department Head. It was difficult to make a living on the wages of nine-month appointments, and

for more than a decade of summers Hesler worked for the U.S.D.A. in wheat-rust eradication survey and potato disease survey, both in the Washington office and New England, Wyoming, the Gulf states. and Mayaguez, Puerto Rico.

In 1934, a disastrous fire incinerated the University of Tennessee botany department physical plant, including an 8000-specimen fungal herbarium, a large reprint collection, notes and manuscripts, all largely plant pathological. In the aftermath, Hesler turned his interest to the abundant fleshy fungi in the Great Smoky Mountains and later in 1934, he was appointed Dean of the College of Liberal Arts. Just before and after retirement in 1958, several major North American floristic monographs of agaric genera were published, mostly co-authored with Alexander H. Smith, the reigning North American agaric authority of the time.

Jennison, Harry Milliken (1888–1940) '11

Harry Milliken Jennison, from Worcester, Massachusetts, received his A.B. from Massachusetts State College at Amherst (class of 1908) but his A.M. from Wabash College (class of 1911). Like Jake Schramm before him, Jennison studied at Washington University, St. Louis, earning a Ph.D. in 1922. Art Stupka (1905–99) wrote of Jennison: "Harry Milliken Jennison was associated with the University of Tennessee from 1922 until his death in 1940. He was given a two-years' leave of absence from his teaching duties in the Department of Botany, beginning in 1935, during which time he served in the Great Smoky Mountains National Park as a wildlife technician under the Civilian Conservation Corps; his chief duties were the collection, identification, and preparation of plant specimens."

"During the summers of 1938 and 1939 Jennison served in the Park in the capacity of ranger-naturalist. In 1938 he prepared A classified list of the trees of Great Smoky Mountains National Park." Jennison's association with Tennessee included the disastrous fire of 1934, which destroyed the department's entire space, including the herbarium.

Osner, George Adin (1888–1964) '11

Like several others in this roster of "Wabash Boys," data on George Adin Osner is sparse after his early career. Born in Madison, Indiana, on the Ohio River, Osner's time at Wabash was concurrent with that of Hesler and Jennison. Moreover, like Hesler, in 1911, Osner was bound for Cornell Plant Pathology on one of Whetzel's "Industrial Fellowships" which actually extended through 1913. At Cornell he was listed under plant pathology, agricultural chemistry and economic entomology with professors Whetzel, Cavanaugh, and Herrick. The next year, his advisors changed to Reddick, Bennett, and Herrick. In 1915 he received his Ph.D. from Cornell. His thesis was "Leaf smut of timothy," published as Experiment Station Bulletin 381. But another event also required his attention; his marriage to Bess Joy ("Beanie") Whetzel, Herbert Whetzel's sister. Perhaps this caused the change in advisors. The following year (1916) another significant paper was published, "Some effects of oxygen and carbon dioxide on nitrification and ammonification in soils" as Experiment Station Bulletin 384, co-authored by Louis Melville Massey (q.v.), a fellow Wabash grad. Also in 1916, Osner

pubished "Additions to the list of plant diseases of economic importance in Indiana," this time in the Proceedings of the Indiana Academy of Science. Osner was on staff as Assistant Botanist at the Purdue University Agricultural Experiment Station. He remained on staff there until at least 1919, but from that year, further data seems missing until late in his life. An unreliable entry reports his death in Delano, Kern Co., California, in 1964.

Babcock, Duane Cook (1887–1961) '12

Duane Cook Babcock graduated from Wabash together with J.H. Muncie, L.M. Massey, C.C. Tomas, and J.L. Weimer. Aiming for Cornell, he was hired under a Whetzel "Industrial Fellowship" that summer, but there is no record of his enrollment at Cornell. Instead, he was listed on staff at the Ohio State Agricultural Experiment Station at Wooster in 1913, with the title Assistant Botanist and Agent of the Laboratory of Forest Pathology. There he was a leader in organizing field studies of Chestnut bark disease. Babcock published "Diseases of forest and shade trees" in the Ohio Agricultural Experimental Station Monthly Bulletin and was on staff when L.R. Hesler was an Associate Plant Pathologist there in the summers of 1925–28. In 1940, Babcock was listed in a bibliography of American forestry, and apparently remained with the station until retirement, and in Wooster, Ohio, until death in 1961.

Massey, Louis Melville (1890–1969) '12

Born in Lima, Ohio, Louis Melville Massey obtained his Ph.D. in Plant Pathology from Cornell in 1916. Massey's thesis, "The hard rot disease of gladiolus" was published as the Experiment Station Bulletin 380. As did others, he stayed at Cornell Plant Pathology, where he taught the general courses for Herbert Whetzel. When Whetzel stepped aside from administrative duties in 1922, Massy became Acting Head, and the following year, Department Head. Several sabbatical leaves were spent at the Boyce Thompson Institute near New York City, and later at the University of California at Berkeley. He retained the department headship until 1950, and formally retired in 1958, after a lengthy career at Cornell. In his memorial: "The least recognized but probably the greatest contribution to his field and his institution was his ability as an administrator. He 'took over' the administrative duties at a time when a small staff was split and discouraged. He directed a reunification and vigorous development, the occupation of new and modern quarters within a few years, and 'turned over' a staff tripled in size and as harmonious in operation as could be expected. He was respected for his honesty, his judgment, and his keen vision."

Muncie, Jay H. (dates unknown) '12.

In 1912–13 Jay H. Muncie held an "Industrial Fellowship" in Plant Pathology, Cornell. Without completing an advanced degree at Cornell, Muncie became an Assistant in Plant Pathology at the Michigan State Experiment Station in East Lansing. Several authored papers appeared as publications of the Experiment Station. He remained on staff until the early 1920s when he moved to Iowa. Muncie received a PhD from Iowa State University in 1926, with his thesis "A study of crown gall caused by *Bacterium tumefaciens* on rosaceous hosts." Again, his research was published, including

in American Journal of Botany. By 1930, Muncie returned to Michigan State where he was on faculty as Research Associate and Extension Plant Pathologist.

Thomas, Cecil Calvert (1886–1936) '12

Cecil Calvert Thomas was one of many students handled by Mason Thomas in his last years. Thomas remained to receive a Master's degree in 1913, then proceeded to Cornell where he was listed as a graduate student in 1913–14 and as an Instructor in Botany in 1915 (not Plant Pathology), but there is no evidence that he obtained the Ph.D. Nonetheless, he was employed by the U.S.D.A. Bureau of Plant Industry and wrote a bulletin on the Chinese Jujube (Thomas 1924), comprehensive enough to be reprinted in the 21st century. His own title at that time was Assistant Plant Instructor, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry,

Thomas was known for his expertise in propagation of trees from cuttings.

Weimer, James LeRoy (dates unknown) '12

Born and raised in Avilla, Indiana, James LeRoy Weimer attended Cornell thereafter. Listed as a graduate student, he was supported on one of Whetzel's "Industrial Fellowships." His Ph.D. thesis (Cornell 1917) was "Three cedar rust fungi their life histories and the diseases they produce," published as Cornell Experiment Station Bulletin 390. Upon graduation, he joined the USDA's Bureau of Plant Industry, where he remained throughout his professional career. His title was Senior Pathologist, Division of Forage Crops and Diseases. Weimer's publications continued into the 1950s.

Burkholder, Walter Hagemeyer (1891–1983) '13

Walter Hagemeyer ("Burkie") Burkholder was born in Crawfordsville, Indiana, so perhaps it was natural that he attended Wabash College (A.B., class of 1913) and succumbed to the mentorship of Mason Thomas. From Wabash he attended Cornell under one of Whetzel's "Industrial Fellowships" and was awarded the Ph.D. in 1917. Upon graduation he was appointed progressively as Assistant, Assistant Professor, and Professor of Plant Pathology. His pioneering work on bacterial taxonomy was adopted in Bergey's manual for some years. His geniality was celebrated in his "official" eulogy: "Burkie was an avid reader of poetry and fiction and especially enjoyed light opera. He was a connoisseur of fine food and liquor, whose subtle delights he happily introduced to others" (Rochow & al. 1983).

Chupp, Charles David (1886–1967) '13

Charles David Chupp was typical of the rough-hewn Hoosiers of his time. Born in Illinois, the family moved to Indiana and Chupp spent his young life with his older brother in Edinburg, Indiana (Boothroyd 1982). In the midst of his Wabash years, Chupp dropped out for three years, working as a school teacher of numerous subjects. Boothroyd (1982) related Chupp's story: "As Chupp recalls, 'I had planned to specialize in English, but regularly got D in that subject while it was easy to get an A in Botany under the teaching of the famous Professor M.B. Thomas. On his deathbed he willed me to Cornell in 1912. Luckily Professor Whetzel, Head of the Plant Pathology Department accepted me.'" Cornell granted him a Ph.D. in 1916, and Chupp returned to Wabash as

Acting Professor of Botany (Thomas had died in 1912), but after one year he migrated back to Cornell. The passage of the Smith-Lever Act in 1914, with funding for the states to conduct extension work, and earlier organization of the Farm Bureau to appoint county agents, laid the groundwork for rapid development of extension activities in the College of Agriculture. Chupp, under the tutelage of M.F. Barrus, then himself leader in the vegetable disease area, entered vigorously into this world of extension and soon became known as the expert. Farmers all over the state (and in fact many people outside the United States) became his friends and admirers. Chupp soon participated with Barrus in developing Plant Pathology extension until his retirement in 1954. Korf's (1991) comment: Chupp "was one of the most beloved of the professors, always cheery, filled with fun, a vegetable pathologist with lifelong interest in the taxonomy of the genus *Cercospora* …"

Gibson, C.B. (dates unknown) '14

I can find no information on C.B. Gibson, Wabash class of 1914. Mason Tomas died in 1912, presumably in Gibson's sophomore year, and Gibson's post-graduation life remains undocumented. A careful check might reveal Kent's (1975) reference to Gibson as faulty.

Pickler, William Eugene (1892–1989) '14

Born in New Albany, Indiana, but early educated in Louisville, Kentucky, William Eugene Pickler moved on to the University of Illinois where he was given a series of fellowships starting at $300 but later raised to $600 for 10-month contracts. He earned a Ph.D. in botany (plant physiology) from the University of Illinois in 1918. His thesis was "Water content and temperature as factors influencing diastase formation in the barley-grain." He was appointed to the Bureau of Plant Industry where his duties were primarily with White pine blister rust eradication. An obituary published in 1989 indicates that he was a Veteran of World War I (unlikely given his academic achievements during the war years) and employed by the Louisville Water Department for 40 years prior to his retirement.

Wann, Frank Burkett (1892–1954) '14

Born in Warsaw, Indiana, Frank Burkett Wann was handicapped from birth (no more specific data found). Though circumstances are unclear, he was enrolled in the Henry Shaw School of Botany in St. Louis and there taught general botany with Jacob Schramm (q.v.) under the leadership of George Moore (q.v.). Seeking additional formal education, he returned to his home state and enrolled in Wabash College, receiving an A.B. in 1914. His time there spanned the death of Mason Thomas. In 1915 he was reported as Teaching Fellow in Botany back at the Shaw School. By 1919 he was reported by Sigma Xi Cornell chapter as Fellow in Botany. Wann's Ph.D. thesis was

"The fixation of free nitrogen by green plants." Wann stayed on at Cornell as an Instructor (1921–23) and was awarded a three-year fellowship by the National Research Council. In 1926 he departed Cornell for an appointment as Associate Professor of Plant Physiology at Utah State College (Logan) and its Agricultural Experiment Station. His research investigated mineral deficiencies in fruit trees and vegetable crops. He became department head of Botany and Plant Pathology in 1952 but lived less than two years thereafter. A quote from his obituary: "Through his classes, many young men at Utah Stare became interested in botany. His encouragement led many students to go away to the leading universities of the world and to become renowned authorities in plant science;" a statement reminiscent of Wann's mentor, Mason Thomas back at Wabash.

Appendix 5.

"Industrial Fellowship" students

Excerpted from Whetzel, H.H. 1945. The history of industrial fellowships in the Department of Plant Pathology at Cornell University. Agricultural History 19(2): 99–104.

* = Wabash graduate. [Shared fellowships indicated by numerical superscripts.]

Name	Year(s)	Funds ($)
Wallace, Ernest	1909–10	1500/yr
*Stewart, V.B.	1909–10	750/yr
[1, 2, 3]Blodgett, F.M.	1910–11	3,000
[1, 2]Jensen, C.N.	1910–11	4,000
[3]Sherbakoff, C.D.	1912–13	
[3]Faulwetter, F.C.	1912–13	
[3]Jagger, I.C.	1911–12	750
	1912–13	750
*Rankin, W.H.	1910–11, '11–12	750/yr
[5]*Anderson, P.J.	1910–11	750/yr
[7]*Hesler, L.R.	1911–12	750
	1912–13	375
[4, 7]Brausher, R.W.	1911, 1912	
[4, 7]*Osner, G.	1911, '12–13,	
	1913–15	[4] 2000
		[7] 1415
	1914	1000
	1915	891
Jehle. R.A.	1911	730
*Stewart, V.B.	1911–12	2000
	1913–14	2000
[5]Wallace, E.	1911–12	2000
*Muncie, J.H.	1912–13	2000
*Burkholder, W.H.	1912–13, 1915	
[6]Crittenden, C.G.	1913–14, '14–15	2176
Honey, E.E.	1917	487
Mix, A.J.	1912–13	1000
	1913–14	915
*Weimer, J.L.	1912	940
Slocum, C.L.	1914	1000
Dye, H.W.	1917–19	750/yr
Newhall, A.G.	1920–22	1000/yr
Gaines, J.G.	1925–26; '26–27	1000/yr
	1827–30	1250/yr
Harrison, A.L.	1930–31	583
[0]Felix, E.L.	1924–25; '25–26	1000/yr
[10]Cook, H.T.	1926–27	?
Vogel, I.H.	1919	1000
White, R.P.	1919–20; '20–21	1000/yr

Name	Year(s)	Funds ($)
Gratz, L.O.	1920-21; ’21–22	1000/yr
[8]Boyd, O.C.	1920	1000
Fernow, K.H.	1920–21; ’21–23	1000/yr
Schlatter, I.P.	1920–21	4000
[8, 9]Fitch, H.W.	1921–22; ’22–23	4000/yr
[9]Pierstoff, A.L.	1923–24	4000
Newlands, R.E.	1925–26	4125
Kightlinger, C.V.	1924–25; ’25–26	1000/yr
[1]Wiant, J.S.	1924–25;’25–26	10009/yr
	1926–27; ’27–28	1250/yr
Burrell, A.B.	1924–26	?
Townsend, G.R.	1927–28, ’28–29	1000/yr
Cook, H.T.	1928–29, ’29–30	1250/yr
Stuart, W.W.	1930–31, ’31–32	1000/yr
	1932–33	1250
Small, C.G.	1928–29, ’29–30	1500/yr
	1930–31, ’31–32, ’32–33	1750/ yr
Erickson, E.T.	1928	1000
Meyer, L.J.	1929–30	1250
Parsons, B.	1930–31, ’31–32, ’32–33	1250/yr
Pirone, P.P.	1929–30, ’30–31	1200/yr
	1931–32, ’32–33	1450/yr
Richards, M.C.	1933–34, ’34 –35	1200/yr
	1935–36, ’36–37, ’37–38	1450/yr
Cannon, O.S.	1938	1650
	1939–40	1600
	1940–41	1500
Lyle, E.W	1931–32, ’32–33	1450/yr
	1933–34, ’34–35, ’35–36	1550/yr
McClellan, W.D.	1937–38, ’38–39, ’39–40	1000/yr
Linn, M.B./ Cochran, V.W.	1941, 1942 (summers)	100/summer
Hyre, R.A.	1931–32, ’32–33, ’33–34, ’34–35	1500/yr
Harrison, A.L.	1932–33, ’33–34	1500/yr
	1934–35, ’35–36	1600/yr